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General Health Assessment, Lvea Em District, Kandal Province, Cambodia

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GENERAL HEALTH ASSESSMENT

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ACRONYMS

ARI	Acute Respiratory Infection
CDC	Centers for Disease Control
CDHS	Cambodia Demographic and Health Survey
CHA	Community Health Assessment
CHNA	Community Health Needs Assessment
CI	Confidence Interval
CIPS	Cambodian Inter-Censal Population Survey
CMAC	Cambodian Mine Action Centre
CR	Cambodian Riel
DHF	Dengue Haemorrhagic Fever
DHS	Demographic and Health Survey
DPHI	Department of Planning and Health Information
GDP	Gross Domestic Product
HH	Head of Household
HIV	Human Immunodeficiency Virus
IRB	Institutional Review Board
MCH	Maternal and Child Health
NGO	Non-government Organization
NIS	National Institute of Statistics
PHS	Primary Healthcare System
SPSS	Statistical Package for Social Sciences
TB	Tuberculosis
TBA	Traditional Birth Attendant
UCHC	University of Connecticut Health Center
UNDP	United Nations Development Program
UNESCO	United Nations Educational Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency of International Development
WHO	World Health Organization

Introduction

Cambodia is a country still recovering from its tragic political history. The violent and unstable political situation over the past 30 years has resulted in very low literacy rates, poor, or often non-existent health care facilities, and limited resources, contributing to high rates of poverty and child mortality. Although there is currently some progress toward alleviating these problems, poor health is a primary factor in limiting the country's ability to prosper. The majority of Cambodia's citizens live in remote rural areas. Approximately 70% are living without access to healthy drinking water. Cambodia has many of the lowest health indicators of Southeast Asia. Child mortality rates are unusually high and many deaths are due to preventable childhood illnesses.

Despite the hardships incurred since the Khmer Rouge in 1975, the country has slowly opened up to the outside world. According to the Human Development Index, Cambodia ranks 131 out of 177 countries (HDI, 2008). The World Bank estimates that Cambodia's per capita gross domestic product (GDP) is $273, making it one of the poorest countries in Asia, and health conditions reflect that poverty (USAID, 2008). The country's health care system suffers from a burden of infectious diseases, primarily tuberculosis, malaria, and dengue fever. Infectious diseases are the leading cause of death. Acute respiratory infections, pneumonia, diarrhea, and neonatal conditions are the leading causes of early childhood deaths. Malaria and dengue fever are a major cause of mortality and morbidity in specific geographical areas, especially in rural areas where access to health care and health education is limited. Low life expectancy and high infant and maternal mortality present some of the most challenging problems in Cambodia.

There is a great deal of work still to be done. The country has progressed significantly in the past decade, and despite many difficulties, this progress will hopefully continue into the future. The responsibility now falls on the Cambodian government, the population, non-governmental organization (NGO), and support from the developed world to continue to move forward. Cambodia's complicated history and socioeconomic challenges make it a unique place to study issues in international health and to collect local baseline data to be used for future planning and program development.

My initial interest in selecting a thesis topic on health in the Kingdom of Cambodia was because it is my home country. I came to the United States as a political refugee, adopted by a church in Avon, CT. Although a victim of the Killing Fields, and raised in a forced labor camp, I was luckier than others because my nuclear family, including mother, father, sister and brother, all survived and immigrated together. We acclimated ourselves to a new world and culture with varying degrees of success. My two siblings and I ranged in age from three months to teenagers; our parents were in their forties.

Because of the kindness of strangers, I was provided the opportunity to start a new life with possibilities only limited by me. I had food, clothing, shelter and schooling as well as health care, unlike my counterparts left behind. When I began my public health education, I discovered my interests leaned strongly toward researching the health conditions of Cambodia. I discovered that comprehensive data, particularly from the rural areas where 85% of the population lives, was virtually non-existent. I became fascinated with the idea of initiating a health survey to acquire baseline data regarding health status, living conditions and education.

Because it is well known that the Kingdom of Cambodia is one of the poorest and least medically and public health served countries of the world, I hoped my initial work could assist in affecting change at the community level. I connected with a US and Cambodia based non-governmental organization NGO working in rural areas. I wanted to provide information that would help the NGO and the community plan for health services and social and economic development. I designed a community health needs assessment and trained community interviewers.

This thesis presents the results of this work. To understand how this country has not progressed to the degree of others in Southeast Asia, it is necessary to understand Cambodia's history. For this reason, the thesis begins with an overview of the country and history. Following the overview is background information on the study location served by the Soksabay Clinic. This thesis then describes in detail the methodology of the study, the results, discussion, study limitations and strengths, conclusion and recommendations.

I am grateful that this thesis work allowed me to apply my MPH courses and skills and also provided me with the opportunity to return to and reconnect with Cambodia. It allowed me to view first hand the changes that have occurred since I left 25 years ago.

Kingdom of Cambodia

Figure 1: Kingdom of Cambodia

Overview:

The latest World Bank Poverty Assessment stated that Cambodia is one of the world's least developed countries. Cambodia has recently emerged from 30 years of civil conflict which created massive social disruption and a complete breakdown of existing national institutions and social infrastructure. The country is facing the challenges of rebuilding social, political and economic institutions, and struggling with corruption. Although the country has sustained peace and stability over the past decade, there is a lasting legacy of poverty, widespread malnutrition and illness, high mortality, and illiteracy.

According to the World Health Organization (WHO), Cambodia is one of Asia's poorest countries, with 34% of the population living on incomes of less than one dollar a day. Cambodia's health indicators rank among the worst in the region. Malnutrition is widespread and contributes to the country's extremely high infant and children under five mortality rates. The infant mortality rate is 154 per 1,000 live births (WHO, 2007) and the maternal mortality rate is one of the highest in the region at 450 per 100,000 live births (World's Children, 2005).

It has recently been estimated that 39% of the population lives below the poverty level and 90% of the poor live in rural areas (Ministry of Planning, 2006). Approximately 85% of the overall population is rural with a high proportion of households without access to safe drinking water or sanitation (Royal Government of Cambodia, 2002).

The Kingdom of Cambodia is an agriculturally-based country located in Southeast Asia. Its borders are Thailand to the west, Laos to the north, Vietnam to the east; the

remaining border is the South China Sea. It has a total land area of 181,035 square kilometers. Phnom Penh is the capital city of Cambodia. The national language is Khmer, and often the people are referred to as Khmer.

The population of Cambodia was estimated at 14 million in 2007 (UNFPA, 2007). The majority of inhabitants (90%) are ethnic Khmer, while the remaining 10% are Vietnamese (5%), Chinese (1%) and others (Cham, Laotian, Thai, 4%). More than a million people (1.04 million) live in Phnom Penh (UNFPA, 2007). The average population density is approximately 75 people per square kilometer; over 84% of the population lives in rural areas. Approximately 51.4% of the population is female. According to the World Life Expectancy reported, the average life expectancy for both sexes is 56. The current life expectancy is 58 years for women and 54 years for men (The Atlas of Cambodia, 2006) compared to 48 for both sexes in 1998 (World Life Expectancy, 1998).

Cambodia is situated in a tropical zone and there are two seasons: rainy and dry. The humid, rainy season lasts from April to November. During the monsoon season, temperatures generally range from 81-95 degrees Fahrenheit. The hottest month is April when the temperature can reach above 106 degrees Fahrenheit. The cool, dry season lasts from December to March, with temperatures ranging from 63-81 degrees Fahrenheit.

Most village houses are built on stilts to avoid rising water resulting from torrential monsoon rains. Ladders or wooden staircases provide access to the house. Sugar palm trees are used for building the walls and roofs of the rural houses. Walls are made of woven bamboo leaves and floors of wooden planks. A small house may consist of only one room with no windows. Most Khmer houses have a statue of Buddha; the

furniture is usually simple and practical. There are no beds; straw mats are used as rugs and to sleep upon; although some houses have wooden frames with short legs on which to place the mats. Residents of some houses use mosquito netting as protection while sleeping. Cooking is typically done in a separate kitchen near the house or outside of the house, covered by a roof. Livestock and farming equipment are kept in the space under the stilts of the home.

Theravada Buddhism is the official religion of Cambodia and is practiced by 95% of the population. The remaining 5% are Christians and Muslims, both religions are growing in urban areas.

Khmer society places great importance on the family. Khmer families consist of a husband, a wife, and their unmarried children. The husband is the head of the family, but the wife is expected to take care of the financial matters in the home. Children are taught to show respect toward their elders and toward the Buddhist monks. Every village has a *Wat* (Buddhist temple). Larger populated areas have multiple temples. Some Cambodian males become Buddhist monks for six months to a year, usually at the age of 16 or younger. It is considered a rite of passage into adulthood. In the villages, parents arrange their children's marriages. The wedding ceremony follows the Buddhist tradition and often lasts for three days. Girls are considered to be of marriageable age at 16; boys are at a slightly older age.

Table 1.1: Cambodia Demographics

Official Name	Kingdom of Cambodia
Capital	Phnom Penh
Geographic Area	181,035 square kilometers (Land 176,520 sq km, water 4,520 sq km) 24 provinces, 185 districts, 1626 communes, 13890 villages
Language	Khmer
Government System	Multi-party under a constitutional monarchy Head of state: King Norodom Sihamoni Prime minister: Hun Sen
Total Population	14 Million (Estimated 2007)
Population Growth Rate	1.8%
Population Under Age 15 [a]	42.5%
GDP Per Capita [a]	$310
Life Expectancy [b]	56 years; Female: 58 Male: 51
Literacy Rate (15 years and older) [c]	67%; Female: 58% Male: 81.8%
Ethnicity	90% Khmer; 10% Other (Vietnamese, Chinese, and Cham)
Religion	95% Theravada Buddhism 5% Christian and Muslim

[a] National Institute of Statistics (NIS)
[b] World Health Organization (WHO), 2006
[c] The Atlas of Cambodia, 2006

History:

Cambodia has existed since 802 A.D. (Area Handbook for the Khmer Republic Cambodia, 1973) and was an absolute monarchy until the proclamation of the Khmer Republic on October 9, 1970. The country and political history can be divided into many distinct periods. The Funan and Chenla governments ruled the kingdom from its inception to the eighth century. The Kambuja or Angkor controlled the country until the early fifteenth century. Cambodia then entered into a 400-year period of decline and struggle for its existence, primarily due to invasions by the Thai and Vietnamese.

Toward the end of the 1960's, Cambodia became involved in the Vietnam War. Continued unrest in the country led to the formation of the Khmer Rouge, a military

organization dedicated to removing Western influence. On April 17, 1975, Pol Pot, a general in the Khmer Rouge, initiated a military coup and took control of the country. Under the new regime, the country was renamed Democratic Kampuchea. During Pol Pot's reign, approximately three million of the population of seven million Cambodians (43.3%) died from torture, murder, starvation, overwork, illness and disease caused by the Khmer Rouge's genocidal regime. Pol Pot systematically eliminated all individuals that were perceived as potential threats. This included all educated people: working professionals (lawyers, doctors, teachers, government workers); people who wore glasses; anyone who demonstrated the ability to read and write. Pol Pot wanted "Democratic Kampuchea" to return to the Year Zero, a new beginning shaped by his vision.

In 1979, Vietnamese forces invaded Cambodia and the People's Republic of Kampuchea was established. When Vietnamese troops left Cambodia in 1989, it was re-named the State of Cambodia. In 1991, Vietnam and Cambodia signed a peace agreement. In 1993, the monarchy was restored and the country became the Kingdom of Cambodia.

Government:

Today, Cambodia is attempting to establish a stable government, based upon democratic principles. The current government is a constitutional monarchy. Elections have been held in the country since 1993 to determine the office of Prime Minister.

The current government of Cambodia is a combination of the British and American systems. It separates government functions into executive, legislative and judicial branches to balance power and gives voting rights to the general population. The Executive branch consists of a Prime Minister and his appointed council. The Prime Minister is appointed by the King, based upon the recommendations of the President and Vice Presidents of the National Assembly in the Legislative branch. Elected officials generally serve five-year terms.

Economy:

Cambodia's economy has made significant progress after more than two decades of political turmoil. However, Cambodia still remains the poorest and least developed country in Asia, with the GDP per capita estimated at approximately 1,400,000 Riel or $339 in 2005 (US$1= 4,128 Riel) (Ministry of Health, 2006). Other sources of economic production include fisheries, forestry, livestock, garment factories and tourism.

Agriculture has always been and continues to be the mainstay of the Cambodian economy in terms of its share of the GDP and provides employment for 74% - 85% of the population. Rice is Cambodia's primary crop, its principal food, and its most important export commodity. Rice is grown on 90% of the country's total cultivated land area (The Atlas of Cambodia, 2006). The principal rice regions surround the Mekong and the Tonle Sap rivers, with particularly intensive cultivation in Batdâmbâng, Kâmpóng Cham, Takêo, and Prey Vêng provinces. (The Atlas of Cambodia, 2006)

Other sources of economic production include fisheries, forestry, livestock, garment factories and tourism. Rubber trees and cattle breeding are the major agriculture

export activities. Fishing in Cambodia ranks fourth in the world and is worth $300 million contributing to about 12% of the GDP (The Atlas of Cambodia, 2006). The Tonle Sap, Mekong, and Bassac are the country's major fishing reservoirs.

A continuous periods of war and conflict between 1970 and 1979 virtually destroyed Cambodia's rice crop. By 1974, rice had to be imported, and the production of rubber, Cambodia's most profitable export crop, significantly declined. The civil turmoil also disrupted Cambodia's fledgling manufacturing industry and severely damaged road and rail networks.

The Khmer Rouge regime (1975-1979) virtually depleted the adult workforce generation by executing those thought to be enemies of the regime as well as brutally overworking, mistreating and abusing the remaining population. Many Cambodians died from torture, misdiagnosed illnesses and malnutrition. With the civil war, Cambodia's already weak economy was essentially destroyed.

By 1995, the economy on average was performing much lower than its capacity before 1970. After the Khmer Rouge was overthrown in 1979, many people returned to being subsistence farmers. An improvement in the economy was gradually observed; and by the mid-1990s, small amounts of rice were exported as Cambodia had become self-sufficient in rice production again. Cambodia's economy slowed dramatically in 1997-1998 due to a regional economic crisis, civil violence, and political power struggles. Foreign investment and tourism fell off. In 1999, progress was made on economic reforms. Growth resumed and remained about 5% during 2000-2003. Tourism became Cambodia's fastest growing industry, with arrivals up 34% in 2000 and another 40% in

2001 before the 11 September 2001 terrorist attacks in the US. There were 2 million foreign tourists in 2007.

In addition to tourism expansion, the clothing sector has contributed to economic growth. Clothing exports were fostered by the 1999 U.S. - Cambodian Bilateral Textile Agreement. However, despite Cambodia's recent growth, long-term development of the economy after decades of war remains a major challenge. The population lacks education and work skills, especially in the countryside, which lacks basic infrastructure. The Cambodian government continues to work to address the country's many pressing needs.

The major economic challenge for Cambodia over the next decade will be creating an environment in which the private sector can develop enough jobs to handle Cambodia's demographically imbalanced population. Approximately 60% of the population is 20 years or younger and will be seeking to enter the workforce within the next 10 years.

While Cambodia's economy has grown in the past few years, the country remains one of the poorest in the region. Poverty is widespread throughout Cambodia, especially in rural areas. Agricultural growth continues to be very slow.

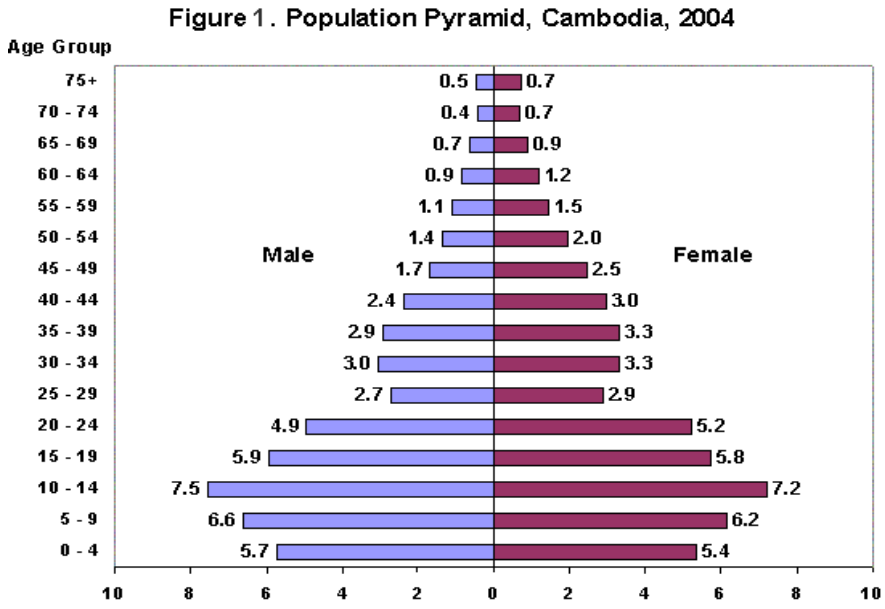
Population and Development:

Cambodia's last official census was held in 1962. It counted the country's population at 5.7 million (Kiernam, 2003). Since the 1960's, the annual population growth rate has been estimated at 2.2 %, the lowest in Southeast Asia. Based on this growth rate, the mid -1972 population was estimated at 7.1 million (Whitaker, 1973).

The 1962 census showed that a high proportion of the population was young; about 46% was under 15 years of age. Fifty-two percent of the population was between 15 and 64 years of age, and 2% was 65 years of age or older. The number of males and females in the population was nearly equal (Whitaker, 1973).

The war between 1975 and 1979 took a substantial toll of approximately 3.3 million people and reduce the population growth (Kiernam, 2003). The population census in 1998 recorded the number of people in the country at 11.4 million with an annual growth rate of 2.5% (National Institute of Statistics, 1999).

Figure 2: Cambodia Inter-Censal Population Survey 2004 (CIPS)



The country's population growth rate decreased from 2.4% in 1998 to 1.8% in 2006, and there was a decline in total fertility from 4% to 3.3% during the same time period (Atlas of Cambodia, 2006). While Cambodia has experienced a rapid decline in

fertility, maternal and child mortality rates remain high and are currently estimated at 450 per 100,000 live births and 124 per 100,000 live births, respectively (UNFPA, 2005).

The average size of households was 5.1 persons in 2004, a decline of 0.1% from 1998. The difference can be attributed to a declining fertility rated coupled with increasing life expectancy, keeping family size relatively stable (Atlas of Cambodia, 2006).

The pyramid (Figure 2) follows a usual pattern of decreasing numbers as age increases. The two age brackets between 25 and 34 (25-29 and 30-34) are smaller than would be expected; these are the age groups born in the 1970s and most affected by the Khmer Rouge regime. That time period was characterized by very few births and very high infant and child mortality as the population, including young children, were in forced labor camps where they died from malnutrition, starvation and extreme working conditions.

Cambodia has a large population of children and adolescents, although the population declines under the age of 5. According to the Cambodia Demographic and Health Survey in 2005, 60% of the population is under 25; 36.5% of that age group is between 10 and 24 years of age. Another 28% are between 25 and 49 years of age and 12% are above the age of 50.

Communication:

The government publishes approximately 15 daily newspapers, mostly in the Khmer language. In 1990, there was one radio per 36 persons, one television set per 141

persons, and one telephone per 790 persons. Those numbers have doubled in recent years. Data is limited; but with access to cellular phones, many people, especially young adults in larger cities such as Phnom Penh and Siem Reap, have telephone access.

Literacy/Education:

There have been great strides in improving literacy since the end of the Khmer Rouge regime. Compared to 1990, when only 35% of the adult population was able to read and write, the literacy rate today among adults age 15 and over is 67%. However, the male adult literacy rate of 81.7% is considerably higher than the rate of females, 58% (The Atlas of Cambodia, 2006).

The Khmer Rouge set out to eradicate the education system. Between 1975 and 1979, their leaders emphasized manual labor and political correctness over knowledge. They claimed that Cambodia did not need an educational system and destroyed all modern education. During this time, people with higher education such as doctors, lawyers, teachers, professors, and college students were killed or forced to work in labor camps. Approximately 42% of Cambodian women and 21% of men above the age of 15 have never attended school.

The school system today has pre-school for children aged three to five, but this is only available in limited areas. Primary education is grades one to six. Although about 93% of Cambodian children attend primary school, enrollment is only 76% in remote areas (Ministry of Education, 2006). Lower secondary education is from grades six to nine. To be able continue schooling beyond the ninth grade, students must pass an exam

for Upper Secondary school, which encompasses grades 10 to 12. After grade 12, there is an exam to graduate with a diploma (called *bac dup*). Examinations are held for the university level and only those with high scores are able to continue their education.

The education infrastructure is poor. Water supply is absent in approximately 52% of primary schools, 53% of lower secondary schools, and 21% of upper secondary schools. Over 41% of primary schools, 36% of lower secondary schools, and 7.5% of upper secondary schools are without adequate toilets (Ministry of Education, 2006).

Teachers are not well paid. The average monthly pay is $30 for primary school teachers. The salaries are slightly higher for secondary school $45 for month for lower secondary school and $55 per month for upper secondary school (Ministry of Education, 2006). Correspondingly, educational attainment is poor. Approximately 30% of students between grades 1 and 2 drop out of school (Statistics and Indicators, 2006). Only 43% complete grade 6 and about 19% complete grade 9 (Statistics and Indicators, 2006). On average, there are approximately 51 students per teacher in the primary schools (Statistics and Indicators, 2006). About 8,000 students graduate from 47 colleges and universities each year (Ministry of Education, 2006).

Poverty:

Despite data limitations, there is consensus on the characteristics of poverty in Cambodia. According to the Cambodia Poverty Assessment of 2006, around 35% to 40% of the population was below the national poverty line, with 90% of the poor living in rural areas (Cambodia Halving Poverty, 2006). Approximately 40-45% of the rural population, 10-15% of the population in Phnom Penh, and 25% of the population in other

urban areas are considered below poverty level (Cambodia Halving Poverty, 2006). In some provinces, the Tonle Sap Basin, for example, 60% of the population is below poverty guidelines (DFID Country Assistance Plan, 2005). The poor conditions are a direct result of long periods of war and internal conflict, the loss of a generation of productive adults, malnutrition, population displacement, and remaining land mines that limit land use. In addition, the rapid population growth in the 1980s and 1990s has resulted in a higher number of dependents per household. Lack of a skilled work force also contributes to the problem.

Poverty in Cambodia is affected by numerous factors, including slow domestic growth, extremely limited social services, inadequate education and health care systems and a lack of economic or social infrastructure. Lack of paved roads, irrigation facilities and basic services including water, sanitation, energy resources, schools and healthcare facilities impede growth.

Cambodia's Health Care System:

A health care system for the inhabitants of Cambodia has been difficult to create successfully as a result of the years of war, government corruption and disinterest. Due to these circumstances, health care is seriously under-funded: less than 1% of the country's GDP is allocated for public health funding (Barber S., 2000). The Ministry of Health's (MoH) objective is to: "improve and extend primary health care through the implementation of a district-based health system" (Ministry of Health, 2006). This charge has created a policy that has expanded the health infrastructure by instituting two

tiers of service: the first one, operational by district level, covers 67 districts; the second one is at a lower level, which consists of local health care posts serving catchment populations of 10,000 (Cambodia Health Briefing Paper, 2000). The aim of the MoH is to provide a minimum package of activities (MPA) to each health post which includes drugs and training sessions for health care workers. Cambodia has continued to plan, establish and outline health problems and specific challenges to be addressed in order to improve health conditions. However, these positive efforts toward national health care have yet to be implemented throughout the country. Since the proposals of 2000 to present, there has been only marginal achievement in the goal of improving the overall health of Cambodians. The limited success is due to the existence of substantial barriers including lack of an effective primary healthcare system (PHC); lack of health care facilities; lack of education; shortage of trained personnel; extremely limited transportation options as well as the inability to pay the costs involved (Bowles, 2005).

While there is, to some degree, a primary health care system in Cambodia, the conditions are often primitive, particularly in rural areas where health facilities are without water, electricity or medical equipment (Bowles, 2005). Typically in rural areas, the health post staff is only present for a few hours each day. There are also frequent instances of payment being requested "under the table". Given the state of the primary health care system, it is not surprising that Cambodians have one of the lowest rates of utilization in the world – the average Cambodian is estimated to have 0.35 contacts with medical services per year (Bowles, 2005). The major sources for medical assistance for the Cambodian people still consist of traditional healers, traditional birth assistants, street pharmacies and, where available and affordable, private doctors.

General Health:

Public health problems in Cambodia fall into three general categories: 1). contagious diseases (e.g., tuberculosis and smallpox), which are unrelated to sanitary conditions or a lack of basic health education on the part of the population; 2) diseases (typhoid fever, intestinal parasites, dysentery and diarrhea, and skin infections) caused by poor sanitary conditions and poor hygiene practices; and 3) disabilities and deaths that result from residual landmines and the lack of adequate medical services.

Cambodian health indicators are among the worst in the Asian Pacific region. The average life expectancy at birth is 51 years for a Cambodian man and 58 years for woman (WHO, 2008). The infant mortality rate is 97 per 1,000 live births (UNICEF, 2006). Cambodia lacks an adequate number of health care workers, especially in rural areas. There are only 16 physicians in Cambodia for every 100,000 people (UNDP Human Development Report 2006). In March 2003, the Phnom Penh Post reported that there were only 374 qualified dentists in Cambodia, or one dentist for 30,000 people. The average six year old child has an average of 9.7 teeth that are decayed or missing (Phnom Penh Post, 2003). Further, in a country recovering from the trauma of war there are only 26 psychiatrists, 40 psychiatric nurses, and 165 doctors trained in basic and primary mental health care (National Programme for Mental Health, 2005).

According to the World Health Organization (WHO) Global TB Report 2006, Cambodia has the 22nd highest tuberculosis (TB) burden worldwide. Approximately two-thirds of all Cambodians carry the *tuberculosis bacterium*, and 13,000 Cambodians

die annually from the disease. There were more than 70,000 new TB cases in Cambodia in 2004, with an estimated incidence rate of 540 cases per 100,000 people (WHO, 2005; USAID Infectious Diseases).

Table 1.2: Demographic and Health Indicator

Total Population [a]	13.9 Million (2007)
Adult Mortality Rate (Probability of dying between aged 15-60) [a]	Female: 297/1,000 Male: 429/1,000
Maternal Mortality Ratio (maternal deaths per live births) [a]	450/100,000
Births attended by trained professionals [b]	31.8%
Women receiving antenatal care [b]	37.7%
Infant Mortality Rate [b]	95/1,000 live births
Under 5 – Mortality [b]	124/1,000 live birth Female:127; Male: 154
Adult Population with HIV/AIDS (aged 15-49) [b] HIV Prevalence [a]	2.6%; 1,463/100,000
Tuberculosis (est. new cases) [a]	70,370 / year 540/100,000
Malaria (cases reported 2003) [a] Malaria (death cases reported 2003) [a]	71,258 492
Poverty [c]	35% of the population live below poverty line; Cambodia ranked 103rd of 125 nations

a World Health Organization (WHO), 2005
[b] United States Agency for International Development (USAID); Cambodia HIV/AIDS, Strategic Plan, 2005
[c] Cambodia Halving Poverty by 2015, 2006

The health status of Cambodia's children is one of the worst in the world (UNICEF, Info by Country, 2007). Out of 1,000 babies born in Cambodia, 95 die before their first birthday and 115 die before the age of five. Child malnutrition in Cambodia is significant, affecting over half of all children under five years of age. Forty-five percent of children under five are underweight for their age. A national survey in 1996 showed that 53% of Cambodian children are malnourished, 17% are severely malnourished. Malnutrition rates are highest in rural areas, where over 80% of the child population

resides (UNICEF, 2007). Malnutrition makes children more susceptible to infectious diseases, such as diarrhea and pneumonia, thus contributing to the high death rate.

Other contributing factors to poor health in children are poor maternal health, limited availability of basic health services and lack of knowledge within the communities, resulting in nearly 40,000 deaths of children under five each year (UNICEF, 2007).

Leading causes of death in Cambodian children are malaria, dengue fever, acute respiratory infection, typhoid, tuberculosis, and anemia. Poor hygiene, lack of sanitation, limited and inferior medicines and the high cost of health care services also contribute to the high mortality rate (UNICEF, 2007).

According to WHO, dengue virus infections are a serious cause of morbidity and mortality in most of the tropical and subtropical countries in the world and the areas where dengue is a health problem have been expanding. It is estimated that up to 100 million cases of dengue fever (DF) and 250,000 cases of dengue hemorrhagic fever (DHF) occur annually worldwide (WHO, 2008). Thus, dengue is one of the most important infectious diseases in the world today. Dengue, which causes fever, headaches, muscle and joint pains, has infected nearly 40,000 Cambodians since the first outbreaks in May 2007 (Phnom Penh Post, July 27, 2007). Over the past year, Cambodia suffered its worst ever outbreak of dengue fever, with some 38,500 cases and 407 deaths. The majority of those sickened were children younger than 15. The young are most at risk because their immune system is not as well developed and provides little protection from the disease.

Dengue fever is transmitted by the mosquito known in Cambodia as the Tiger mosquito because of its stripes. It is most prevalent during the rainy season. Symptoms include a rash and high fever in children; in adults these can be accompanied by headache, pain in the joints, muscles, and eyes, and, in severe cases, hemorrhaging. The high fever can produce fits and hemorrhagic shock, which can lead to death within 12 hours. In May 2007, the Angkor Hospital for Children in Siem Reap treated 219 cases, compared to only 10 for the same time period in 2006. In June 2007, dengue cases numbered 723, 678 more than in 2006–a staggering 94% increase (Phnom Penh Post, July 13, 2007).

Parent to child transmission of diseases such as hepatitis, tuberculosis and HIV/AIDS also contribute to child mortality. According to the Anti-AIDS Center, there are 30,000 HIV- infected children in Cambodia. Approximately 40,000 children are orphans whose parents died of AIDS (UNICEF, 2007).

Cambodia has the highest HIV prevalence rate in Southeast Asia, even though prevalence of HIV infection among adults appears to have leveled off over the last few years (WHO, Cambodia Health Situation, 2007). The high prevalence of HIV has been attributed to the lack of access to information, counseling and testing, condoms and diagnosis and treatment of sexually transmitted infections (STIs) (USAID/Cambodia, 2002). The first HIV positive person was detected in 1991 at the National Blood Bank in Phnom Penh and the first AIDS case was diagnosed at Calmette Hospital in 1993. The HIV epidemic quickly spread countrywide. The peak of the epidemic was in 1998 with about 179,000 people living with HIV/AIDS. This is in part due to the increasing

mobility of the population from the rural areas to the city and the availability of sex workers.

Using the HIV Sentinel Surveillance and Behavioral Sentinel Surveillance data combined, the estimated HIV prevalence among adults (15-49) has been declining consecutively from 3.3% in 1998 to 2.8% in 2000 and 2.6% in 2002. Despite this positive trend, diseases related to AIDS killed about 90,000 people in Cambodia in 2004. Furthermore, by 2010, the death toll is projected to reach 236,000 (Dr. Tia Phall, Secretary General, National AIDS Authority, Phnom Penh Post, June 2004).

According to the Cambodian and American Partnership to Fight HIV/AIDS, approximately 18,200 HIV-infected individuals were receiving antiretroviral treatment in 2004. In that same year, roughly 36,300 pregnant women received services for the prevention of mother-to-child HIV transmission. In addition, approximately 192,900 individuals received counseling and testing on HIV transmission in the 2006 fiscal year (USAID: 2007, Country Profile: Cambodia).

Landmine injuries are also a significant health problem in Cambodia. The Cambodian Mine Action Centre (CMAC) estimates that there may be as many as four to six million mines and unexploded ordinances in Cambodia. In 2006, there were 450 new mine casualties in Cambodia (61 people killed and 389 injured). This was a decrease of nearly 50% from 2005 (875 casualties); in the preceding years of 2000-2005, the casualty rate was 846. As a result, Cambodia has the one of the highest rates of physical disability of any country in the world. The number of people killed, injured or disabled due to landmines reached 62,638 for the period 1979-2006 (Landmine Report, 2006). Approximately 60% of the casualties from landmines occurred while the victims were

engaged in their daily activities such as farming, herding, clearing land, fishing, collecting food and wood, or while traveling (18%) (Landmine Report 2006).

National statistics vary in their assessment of the prevalence of disability in Cambodia; the National Institute of Statistics (NIS) reported that in 2003, 1.5% of Cambodia's total population was disabled, while the 2004 CSES (census) estimated the disability rate in Cambodia was 4.7% of its total population. Using this percentage would mean that in 2007 approximately 664,000 of Cambodians have a disability (People with Disabilities in Cambodia, September 2007).

Maternal Mortality:

According to the World Health Organization, a maternal death is any death that occurs during pregnancy, childbirth, within two months after giving birth, or while terminating the pregnancy. Worldwide, there are 40 to 50 million pregnancies each year, with a total of 536,000 maternal deaths in 2005. Developing countries such as Cambodia accounted for 99% of those deaths. Worldwide, there are 400 maternal deaths per 100,000 live births (WHO, UNICEF, World Bank, 2005). The 450 maternal deaths per 100,000 live births in Cambodia make maternity-related complications one of the leading causes of death for Cambodian women ages 15 to 49 and results in the country having one of the highest maternal mortality rates in the world (WHO, 2008). Additionally, another 58,000 to 87,000 Cambodian women and girls suffer from disabilities caused by complications during pregnancy and childbirth annually (CDC, Council for the Development of Cambodia, 2006). Major causes of maternal mortality are hemorrhage,

eclampsia infection, toxemia and obstructed labor. Anemia is another contributor, 58% of the pregnant women have anemia or iron deficiency, or both, as a result of poor nutrition (UNICEF, Cambodia Statistics, 2008). The shortage of skilled birth attendants and health care facilities in rural areas means that women experiencing problems during the delivery to not receive emergency obstetrical care.

A national survey in 2005 reported 90% of the women delivered their children at home with the assistance of traditional birth attendants (CDHS, 2006). Only 38% of pregnant women received some form of skilled care before giving birth. Also, poverty forces poor Cambodian women to work hard in the fields immediately after delivering their babies, sometimes exacerbating pregnancy and delivery related problems. The costs of health care for complications are too high for many women, often causing families to sell their land.

Traditional Birth Attendants:

In 2006, the United Nations General Assembly agreed that concerted efforts must be made to increase the proportion of births assisted by skilled attendants to 80% in 2005 and 90% in 2015 (Rasch, 2007). However, barriers to achieving this goal are complex and the 2005 goal of 80% delivery by skilled attendants was far from reached: globally, only 50% of the births were assisted by skilled attendants in that year (Rasch, 2007). A "skilled birth attendant" refers to a health professional such as a midwife, doctor or nurse who has been educated and trained to manage any normal childbirth.

In 2006, 61.5% of births world-wide were attended by a skilled health professional, compared to only 33.7% of births in the least developed countries.

According to the Department of Reproductive Health and Research in Cambodia, only 31.8% of births in 2000 were delivered by a skilled attendant (28% by a nurse midwife and the remaining 4% by a doctor or nurse). With over two-thirds (68%) of births being delivered without a skilled attendant, the high rates of maternal deaths in Cambodia are not surprising (The Lancet, 2005). In Cambodia, most rural women prefer to have their babies at home, mainly because they cannot afford to pay doctor's fees and because travel to hospital or health centers is too difficult. Instead, they invite a traditional birth attendant (TBA) to help deliver the baby. According to the Ministry of Health, 90% of births in Cambodia occur at home or in non-medical facilities.

As might be expected, there are major disparities in type of delivery assistance between urban and rural women in Cambodia. Whereas, 57% of urban women receive delivery assistance from a trained professional, only 28% of rural women receive trained professional help. Rather, rural women are more likely to receive assistance from a traditional birth attendant (70%).

Nutrition Problems:

The World Bank has indicated that over half of the child mortality in developing countries can be linked to malnutrition (PRB, 2003). From the early stages of development into adolescence, proper food and good nutrition are an essential to survival, and also to mental development, productivity, health, and well being. Laying the groundwork for a healthy and productive life, good nutrition can increase children's resistance to disease. Nutritional problems in Cambodia are related to the poor health status of the population. Almost half (45%) of Cambodian's children under age 5 are

malnourished (PBR, 2003). Lack of food is not the only cause of malnutrition; poor feeding practices, inadequate breastfeeding, inappropriate foods, and insufficient quantities are all contributing factors (PBR, 2003). Malnourished children have lower resistance to infection and are more likely to get sick and die from common childhood ailments like diarrheal disease and respiratory infections.

According to the findings of the CDHS 2005, malnutrition in children 6-59 months old continues to be a major problem in Cambodia (CDHS, 2006). The prevalence of children underweight was 52%, with stunting 56%, and 13% of children were wasted (acute malnutrition). Evidence shows that malnutrition can increase the likelihood of mortality from a number of different diseases and may be associated with up to 56% of all childhood mortality (Panagides et al., 2002). This makes malnutrition one of the most serious public health problems in Cambodia. Furthermore, micronutrient deficiencies have been shown to increase the risk of morbidity, and impair cognitive development and growth (CDHS, 2006).

CDHS data shows that the percentage of children underweight double from 5% among children under age 6 months to 10% among children aged 6-8 months, increases seven times among children aged 9-11 months, and then peaks at 45% among children aged 18-23 months. The survey indicated this may be due to inappropriate or inadequate feeding practices, because the increasing level of children underweight coincides with the age at which complementary (grains and other solid food) feeding starts.

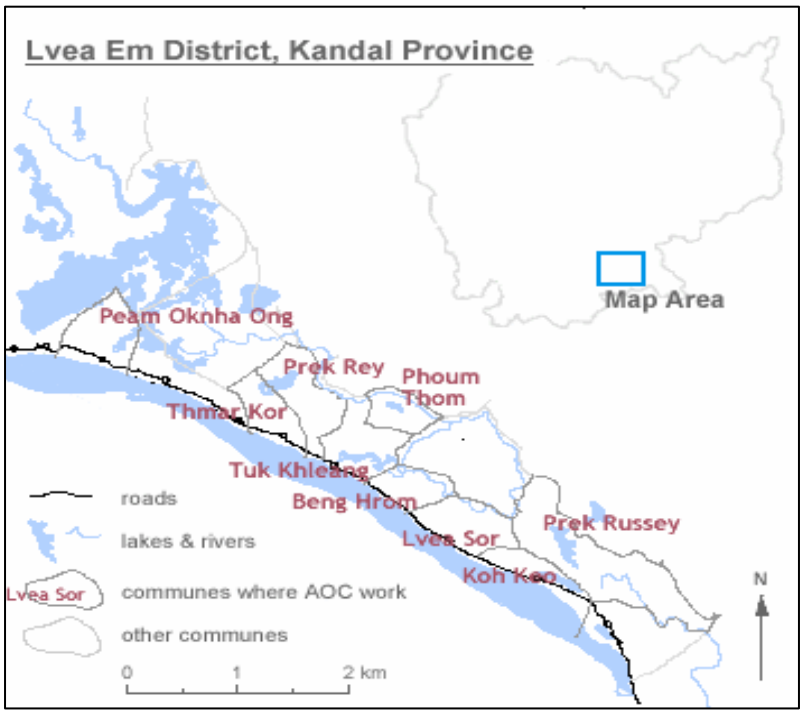
Breastfeeding in Cambodia is universal with 97% of children having been breastfed at some time. About one in three children (35%) is breastfed within one hour of birth and 68%, within one day of birth. Fifty-six percent of children are given

prelacteal (plain water, sugar water, and fruit juice) feeding other than breast milk during the first three days of life (CDHS, 2006). Certain characteristics have been found to influence early breastfeeding practices. Female babies, for example, are more likely to be breastfed within one hour and male babies, within one day. Breastfeeding also is more common among children who are delivered by health professional than among children delivered at home. The CDHS survey also shows that highly educated mothers are more likely to put their newborn to the breast within the first hour or day of birth. The percentage of children who are put to the breast early increases as wealth increases as well (CDHS, 2006).

STUDY SITE: LVEA EM DISTRICT

This research project took place in Lvea Em District, Kandal Province. Lvea Em is a rural area which is located about 70km (43.5 miles) to the east of Phnom Penh. Lvea Em District is a flood plain on the north bank of the Mekong River, accessible only by boat. Every year the Mekong spills over its banks during the rainy season and floods the district's forests and rice fields. Growing rice as the main crop is impossible because of the yearly flooding, so only one low-yielding dry season crop is possible after the waters recede. The district's total population is approximately 85,760, living in 15 communes and 43 villages. Most of the population (84%) is older than five years of age; 2,417 are children under the age of one and 12,092 are between one and five years. There are 15,652 women of reproductive age (15-45) (Asian Outreach Cambodia, 2006).

Figure 3: Map of Lvea Em District, Kandal Province, Cambodia



The study site covered 3 Communes (Phoum Thom, Prek Rey, and Prek Tasor) which is Lvea Em District. The three Communes comprise approximately 16,000 people in 9 villages. The primary occupation of the population is agricultural work. Most of the population of Lvea Em lives without electricity and basic health facilities and without access to clean water and safe sewage disposal. Prior to November of 2006, there was no health center in the area. The inhabitants had to travel about 20km (12.4 miles) to the Health District Center--by boat during the flood season and by bicycle or motor-bike during the dry season.

With long distances to the government health center and a lack of health supplies, Asian Outreach Cambodia (2006) found that 11% of the commune population died of preventable illnesses, particularly children under 5 years old. According to the Commune Development Council Statistics, each family spent about 17% of its annual income for medicine and travel costs to the district health center (Asian Outreach Cambodia, 2006). In addition, people traveled 3-4 hours to the Phnom Penh hospital to receive medical treatment. Those who were seriously ill and unable to afford the medical expense often had to sell their farms or homes to get treatment.

Health Clinic Beginnings:

In 2004, Dr. Mary Ann Herron, Director of Special Projects for the Harold Grinspoon Charitable Foundation in Springfield, Massachusetts met with a group of women on a bamboo floor, sipping coconut water and chatting. Mr. Arun Sotha, who was originally from the village served as an interpreter. He was also someone the villagers knew and trusted. Mr. Sotha has developed many community programs in

Phnom Penh, including an orphanage for abandoned children. He has also continued to support development in his village, in Lvea Em.

Dr. Herron asked the women what she could do to help the people in the village. The women shared that they had not had any medical care since the Khmer Rouge "came through in 1975." They said that many women had their babies at home on the floor or outside of their homes and that people were dying, “probably due to HIV” and other illness and diseases. Throughout the conversation, the high mortality in the villages was frequently mentioned.

Two years later, with the assistance of Mr. Sotha, a new clinic was built. Dr. Herron raised the money and she and Mr. Sotha planned the clinic. The land was donated by the Buddhist temple located on the adjacent property. From one conversation and a draft plan, the clinic was constructed and a commitment was made by the District Health Department to provide two nurses and a doctor. When the clinic opened, the District Health Department could only provide three medical staff: a nurse, midwife and a medical assistant. Originally the staff salaries were to be paid by the District Health Department. However, salary support has not been provided thus far so Dr. Herron has also raised the funds for payment of staff so the clinic can continue operations.

The Soksabay Clinic consists of four rooms. There is one room for delivery, one room for post deliver; third room consultation and a forth room for the pharmacy. The gallery of the clinic is used for intake and preliminary assessment of problems. The clinic, which began operation in November 2006, provides basic primary care services with 2,000 to 3,000 patient visits per month (Soksabay Clinic Monthly Report of Activities, 2007). With a staff of five providers (one male nurse, two midwives, one

pharmacist assistant, and a clinic assistant), the clinic works in collaboration with the District Health Department of the Kandal Province and the Commune Development Council. The medical care provided by the clinic includes vaccination; pre-natal care; family planning; treatment of simple diseases or illnesses such as diarrhea, pneumonia, cough, fever, small injuries; and non-complicated deliveries. The clinic delivers 10-20 babies per month.

According to the clinic reports, approximately 100-150 patients come for care on a daily basis. Upper and lower respiratory infection and skin infections are the most common conditions (Table 1.1). The clinic reports are routinely grouped by age: 0-4 years; 5-14 years; 15-49 years and over 50 years.

The clinic is open Monday through Saturday from 8am to 3pm for consultation and is available 24 hours a day for emergencies and deliveries. It primarily treats patients from nearby villages. A review of the medical records from April to July, 2007 reflected nine recurring ailments across age groups, and a few additional categories for adults. Other medical complaints were not mentioned often enough to report.

Table 1.3 reflects a total of 5,196 symptoms of cases seen at Soksabay Clinic between the months of April 1 and July 31, 2007.

Table 1.3: Soksabay Clinic Reported Cases by age group

Data based on 3 communes; 9 villages; estimated population covered – 16,041

Age 0 – 4	2007 April – July
Upper ARI	455
Lower ARI	232
Dysentery	93
Simple diarrhea	28
Skin infection	33
Eye disease	5
Urethral discharge	8
Dengue fever	2
Other health problems	158
Total	**1,014**

Age 5 – 14	2007 April – July
Upper ARI	733
Lower ARI	82
Skin infection	49
Dysentery	40
Simple diarrhea	19
Urethral discharge	15
Eye disease	5
Dengue fever	5
Other health problems	403
Total	**1,351**

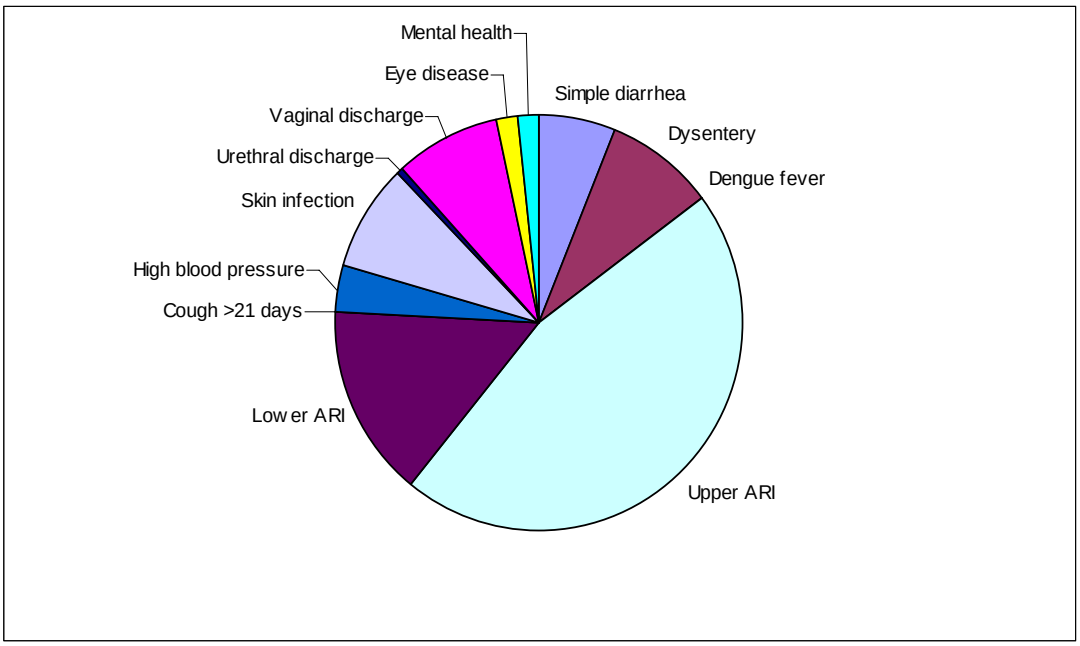
Age 15 – 49	
Upper ARI	250
Vaginal discharge	171
Skin infection	90
Simple diarrhea	62
Dysentery	52
Lower ARI	32
Mental health	22
High blood pressure	30
Eye disease	14
Cough >21 days	1
Other health problems	1,342
Total	**2,066**

Age 50 and over	
High blood pressure	65
Upper ARI	42
Lower ARI	26
Skin infection	15
Simple diarrhea	21
Dysentery	13
Eye disease	13
Vaginal discharge	14
Mental health	9
Other health problems	546
Total	**764**

The figure 4 indicates the health problems or symptoms identified in patients at Soksabay Clinic for the months of April through July 2007. The data from the clinic is

comparable to the CDHS 2005 data as it indicates that acute respiratory infection is leading cause of illness in Lvea Em.

Figure 4: Health Symptoms Reported



The symptom/diagnosis proportions in Figure 4 are comparable to the CHDS 2005 data with acute respiratory infection the leading cause of illness in Lvea Em. Slightly less than half of the population went to the Soksabay Clinic to seek treatment or medical advice. According to the CDHS 2005, fever was the primary illness, a possible symptom of malaria and other acute infections in children (CHDS, 2006).

COMMUNITY HEALTH NEEDS ASSESSMENT (CHNA)

The social well-being of rural communities such as those in Phoum Thom Commune, Lvea Em District, is dependent on many factors, specifically accessibility to services that meet basic human needs: housing, education, social services, and health care. Social capital (i.e. social cohesion and social trust) and an environment free from hazards are also critical for creating healthy communities. Changes in the availability of resources to rural areas can greatly influence the standard of living.

Assessing community health is an essential part of the health planning process. A Community Health Assessment (CHA) is a dynamic process used to identify the strengths and the needs of the community. The CHA enables the community to establish its specific health priorities and facilitates collaborative planning to improve the community health status and quality of life. Community assessment is combining the information collected from a variety of sources including the community itself, and analyzing it to determine specific needs and priorities. This study reports the CHA in Phoum Thom based on household level data and secondary sources of information as well as external factors influencing health.

Evidence suggests that these determinants have an effect on our health status and outcomes. By using indicators of health problems (such as diarrhea and intestinal problems), we are able to assess the major influences on the health of the population. The Community Oriented Primary Care (COPC) model has used CHA as one of its foundations, this model has been operationalized in different ways and in different places with documented success. COPC is a model that traces its roots to the work of Sidney

and Emily Kark and their colleagues. They set up an innovative, socially oriented clinic and public health outreach program in a rural area of Natal in South Africa, specifically in the village of Pholela, in the early 1940s (Iliffe, 2003). At that time, organized primary health care proved to be inadequate to address the multiple health and disease problems of the community, so they implemented a strategy of community assessment, in which the entire community was viewed as the "patient" (Brown, 2002). In this approach, health professionals found that social, cultural, economic, and environmental determinants were more important factors affecting health than particular disease-causing agents (Tollman, 1991). The Karks also did surveillance work as well as training indigenous health workers who carried out surveys, staffed the clinic, and gradually took on increasing responsibilities training others in health work (Abramson, 1982). COPC has become incorporated into many health projects and settings and has also been introduced into the curriculum of educational programs in universities around the world.

Community health needs assessment is an approach that helps provide services that address needs rather than reacting to demands. A successful community health needs assessment should include the following steps:

- Define the population and target population.
- Describe the state of health of the local people. Through the health assessment process, factors reviewed should include physical health status including illness; social problems of individuals or groups; physical impairments and environmental problems all of which may affect community health and social welfare.

- Obtain information and views from community members by surveying a reasonable and representative percentage of the community to find out which health problems are most prevalent.
- Collect epidemiological, behavioral, and other data and employ quantitative and qualitative methods to determine health needs by using quality, valid, and reliable data sources.
- Once the needs of the population are identified, determine the community's health priorities based on the information collected (the importance placed on the health issue and impact of the health issue on the population and the function of the community); define the feasibility of providing programs or services that will implement a change to improve the health status; and integrate clinical care and public health.
- Identify and summarize training needs. Summarize the most critical training needs relative to the health priorities and list them in order of priority. This may include both types of training needed and number of workers required to provide training.

Community Health Needs Assessments can aid communities in determining their resources, issues and challenges, and can be a powerful tool in assessing and then addressing community needs.

METHODOLOGY

Introduction:

The project was part of the initial phase of a new clinical program in Lvea Em. The goal was to identify the health needs of the community. This Community Health Assessment (CHA) was designed to enable the community to participate in establishment of health priorities and facilitate collaborative planning to improve community health status and quality of life. The main objective of the study was to obtain current information on the population, their perceived health conditions and existing available health resources for the communities served by the Soksabay Clinic. This information will be used for future planning and program development.

Process:

The project stakeholders were engaged throughout the survey process, including revision of the questionnaires, translating, training, and interviewing. Table 1.4 lists the stakeholders consulted during the survey development process.

Table 1.4 – Stakeholder consultation and training:

Review of Tools:
Professor Judy Lewis – University of Connecticut Health Center Mary Anne Herron, Ph.D.; Director of Special Projects, Harold Grinspoon Charitable Foundation; Founder of Soksabay Clinic Mr. Arun Sotha, Administrator, Founder of Soksabay Clinic Dr. Li Sophornnarith – Lvea Em Health District Director and Deputy Director of Kiem Svay Operational District Mr. Long Heng – Clinic nurse in charge Mr. Vey – Commune leader

The initial contact for this project was with Dr. Mary Ann Herron, Director of Special Projects, Harold Grinspoon Charitable Foundation in Springfield, Massachusetts. Professor Judy Lewis (the academic advisor), the author of this thesis project, and Dr. Herron met in early spring of 2006. The purpose of the meeting was to explore the possibility of a thesis project connected with Soksabay Clinic. Dr. Herron indicated that the clinic was in need of data and a system to help it prioritize services as well as to understand the health needs of the population. She was very interested in a study that would collect data that could be used for the further development of the clinic. Dr. Herron then contacted the co-founder of the Soksabay Clinic, Mr. Arun Sotha, in Cambodia and made arrangements for further discussion and development of the project.

This author wrote a proposal to conduct a community health needs assessment based on a census of the population, created the questionnaire, and submitted the proposal to the Institutional Review Board (IRB) at the University of Connecticut Health Center (UCHC). The research was approved by the Master of Public Health Program and the UCHC IRB in June, 2006.

Upon arriving in Cambodia on June 30, 2007, Professor Judy Lewis and the author arranged a meeting with Mr. Arun Sotha, co-founder, to discuss the research process and the details of the research project. Mr. Arun Sotha then set up a meeting with the Lvea Em Health District Director, clinic staff and two commune leaders in the village for the following day. An additional participants in the afternoon were 12 village leaders, representing the villages involved in the project. Training the village leaders on the questionnaire and its administration as well as providing interviewing training and practice also took place on this first day in the village. The next day Mr. Sotha took

professor Lewis and the author on a tour of the villages near the clinic and some informal interviews were conducted.

Sample Design:

The original data collection design consisted of a 100% census of the population. This was not feasible due to unanticipated costs, time and the need for IRB modification. The final study design was a household survey conducted by interviewing household heads, using a 50% community sample. Six of the nine villages were sampled (Table 1.3). The remaining villages were not easily accessible and their village leaders were unable to participate in the training, so they could not be included in the survey. The sample was randomly selected beginning at a point in the village and selecting every other household.

Table 1.5: List of Villages and Communes Surveyed

	Village	Commune
1	Prek Taprang	Phoum Thom
2	Prek Kroch (upper river)	Phoum Thom
3	Prek Kong Reach	Prek Rey
4	Prek Rey	Prek Rey
5	Prek Kroch (across river)	Prek Tasor
6	Prek Tasor	Prek Tasor

The survey focused on socio-demographic information, sources and utilization of health care, health conditions and deaths. A master list of villages and residents was not available. The villages that were sampled had a population of approximately 1,700

families and 9,000 individuals. The field research was conducted by the author from July 4, 2007 to July 28, 2007 from a base in Phoum Thom Commune.

Questionnaire/Assessment Tool:

The questionnaire was developed in the United States at the University of Connecticut Health Center where it was translated into Khmer and back translated into English (see Appendix A). The questionnaire was emailed to Mr. Arun Sotha in Cambodia and reviewed by him at different stages of development. The survey was typed in Khmer for printing.

The questionnaire was designed to collect socio-economic and health data on all members of the household. The data collection/survey was divided into four sections: household composition, including socio-economic status and school enrollment; health information, including drinking water; women and infant health practices; and disabilities and deaths. A technical meeting with the representative of the Lvea Em Health District, commune and community leaders was held to discuss the content of the questionnaire. Additional refinement of the translation and questions was accomplished during this meeting. One example of the revisions was specification of the question from "where did you give birth?" was clarified to "where did you give birth to your last child?"

The socio-economic questions gathered the following information:

- Total family members in the household
- Gender of the head of household
- Characteristics of each member of the household; age, sex, education level; relationship to the head of the household

- Ownership of livestock
- Modes of transportation
- Ownership of household items

The health information section gathered the following information:

- Recent illness(es)
- Symptoms of illness
- Use of mosquito nets
- Source of drinking water
- Utilization of health services
- Distance traveled for treatment

The women's health information section covered:

- Age when first child was born
- Number of pregnancies
- Number of live births
- Number of miscarriages
- Where last child was born
- Who assisted at last delivery
- Breastfeeding last child

The disabilities section gathered data on:

- Sex of disabled person
- Age at occurrence
- Relationship to head of household
- Type of disability
- Cause of disability

The mortality section gathered data on:

- Sex

- Age
- Relationship to head of household
- Place of death
- Date of death
- Cause of death

Training and Fieldwork:

The goal of the training was to create interview teams of two (one male and one female). Each team was to be responsible for data collection from 50% of the households in each village.

A group of 12 people attended the training. Their ages ranged 28 to 60 years. They were asked to participate in the project as the interviewer teams and all interviewers were trained in the survey process. The group was comprised of ten men and two women.

The all-day training was conducted in the Buddhist Temple next to Soksabay Clinic. The training agenda included a project overview, discussion of survey objectives, a review of the questionnaire, a practice session and a demonstration on how the questions should be asked. None of the interviewers had prior interviewing experience. All of the interviewers were farmers, and one was also a commune leader. Five villages were represented in the training session. The sixth representative, ill on that day, was trained by one of the participants. There were approximately two people per village who attended. The interviewers were paid $2 per day to cover transportation expenses and compensation for their time.

Pilot Study:

Copies of the questionnaire were provided to the team members. The initial questionnaires were administered to households based on proximity to Soksabay Clinic. The completed documents were to be returned to the clinic were the author would review them for completeness and check for any major problems or inconsistencies, such as age and relationship to the head of household. For surveys with identified problems, the author contacted the interviewer and reviewed the information. All surveys were returned to the author at the clinic. Debriefing sessions were held with interviewers.

After reviewing several surveys from each team, the author randomly selected a survey and asked the respective interviewer to identify the household. The author then visited the family and validated the information. The author was able to select two households from each village and verify the information with the exception of two villages, Prek Rey and Prek Tasor. These two villages were unable to be reached, based upon the distance from the clinic and poor road conditions at the time of the survey.

Interview Methods:

Interviews were held in the homes of the village residents. The interviewers were instructed to provide a brief introduction about how much time the interview would take and the purpose of the survey. Prior to the interview, the household head was informed the questionnaire was optional, that no names would be recorded, and that the information was confidential.

The main respondent was generally the head of the household or the person responsible for the family. The family head provided the majority of information. However, in cases where multiple adults were living in the same household, each adult male was asked to provide his own information. The exception to this was when questions were asked regarding children, particularly young children, and those specific to reproductive health and birth. Those questions were answered by the women in the household, usually the spouse.

Demographic information was straightforward and presented little difficulty in collection. Gender, age, relationship to the head of household, marital status, literacy, level of education, type of work, and family monthly income was recorded.

Household possessions, livestock, means of transportation, and water resources were also recorded. These questions were open-ended and the interviewers were able to record multiple items with little difficulty. The interviewers were asked to record the possessions that could be seen in the home. Local custom and the layout of the homes prevented thorough observation of the entire home. The interviewers typically were in the communal section of the house and were not invited to view the sleeping quarters, typically the upstairs level. House construction was included in the questionnaire. The interviewers recorded the type material used for walls and roof of the home.

The health and women's reproductive history were also open-ended. The general health questions were asked in an open-ended way, e.g., "What are your current health problems or symptoms?" "Where do you go for treatment?" and, "Where do you go for medical emergencies?" Generally, the head of household would provide answers to these questions. The interviewers recorded all the symptoms that were described. The

interviewers also asked about medical expenses but this was not consistently done because it was not included on the original questionnaire. The interviewers kept a master copy of the questionnaire, including the corrections and the question additions. Some of the interviewers did not update their master copy and therefore did not ask all of the questions that were eventually agreed upon.

Some of the questions were re-worded to make them more understandable to the population, particularly those questions concerning women's health issues. The intent was to determine whether family size was due to choice or to lack of access to contraceptive methods. To encourage complete reporting, women were asked about their "age when they delivered their first child", "number of pregnancies," "number of live births," "number of miscarriages," "where was the last child born," "who assisted at the birth of the last child," and "how long did you breastfed the last child." Two questions (e.g., "Are you currently pregnant?" and "Are you currently using contraception?" were added to the survey verbally and the interviewers were asked to write them down on their master survey.

Information on disabilities and deaths was also collected. Disability information was collected for both adults and children by inquiring about the sex, age, type of disability, and the cause of disability. Information about mortality for children and adults included sex, age, and relationship to head of household, place and date of death and the cause of death if known.

The last question on the survey was an opportunity for respondents to add any additional information about their household or any other issue they were concerned with

regarding the health of their family and community. A copy of the Community Health Survey is included in Appendix A.

Through this method, the social demographic and general health assessment was collected for 3,261 people in six villages of three communes in Lvea Em district.

Data Entry and Analysis:

All data were recorded in Khmer. As soon as the surveys were completed and returned to the author, they were coded by village and interview team, and a unique ID was assigned to each household. The surveys were translated from Khmer into English and entered in an Excel spreadsheet. The translation and data entry were intense and time consuming activities. The translation involved repeatedly checking the interviewers' writing for clarity or asking them about unclear details. The author trained the translators in the survey and data entry process; all data were entered in Excel by the author.

Upon the author's return to the University of Connecticut, the data was imported into SPSS (Statistical Package for the Social Sciences, version 15) for data analysis. String variables were recoded into numeric codes. These variables included *Village, Sex, Relation to head of household, Marital status, Occupation, Type of house wall and roof, Water source, Health problems, Disability, and Cause of Death.*

Other variables were also recoded in SPSS to allow for categorical analysis (age group, education level, and health symptoms). Analyses primarily focused on descriptive information. Frequencies and other descriptive statistics were used to develop codes.

The Chi-square test was used to explore the association between variables. Cross-tabulations were performed to examine the association of demographic variables with health symptoms. Statistical significance tests were performed at the <= 0.05% level. Subjects with missing values were excluded from the relevant analyses.

Actual household income was used as an independent variable, but for most of the analyses income per person in the household was used as a more sensitive measure of resources in a household. The new variable "income per capita" scale was created by dividing the total household income by the number of people in each household. This was then dichotomized into low income per capita (< 16,000 riel) and high income per capita (>= 16,000 riel).

Household possessions (radio, TV, generator, bicycle, motorbike, boat, cow, chicken, and pig) were combined to create a new variable, total household possessions. This variable, "total household possessions," was then divided by the number of people per household to create "new household possessions." This variable was also dichotomized into high (.10 or more items) and low (zero items).

Similarly, "health symptoms per capita," was created by dividing the number of reported health symptoms for the household by the number of people in each household. The scale was then dichotomized into low symptoms per capita (< one symptom) and high symptoms per capita (one or more symptoms).

HEALTH ASSESSMENT RESULTS

Socio-demographic Characteristics:

Surveys were conducted with heads of 661 households (100 female and 561 male) in six rural villages in the Lvea Em District. The total population of these households was 3,261 (1,666 female and 1,595 male). The demographic characteristics of the study population are presented in Table 2.1.

The households in Lvea Em range from one to 10 members; the mean family size was 4.9 people (Table 2.1). Households between three and six members were the most common (17.6%). The majority (84.9%) of the households were headed by males. Most (85.5%) heads of households were married, the remainder were widowed (12.6%), divorced/separated (1.1%), and less than 1% were single.

The mean age of the heads of households was 46.1 years (range 22-87). The majority (81.4%) were literate and averaged 4.9 years of school completion. They were predominately (93%) farmers with an average household monthly income 106,884 riel ($26 USD).

Table 2.1: Characteristics of Head of Household Respondents (n=661)

Head of Household Characteristics		n	(%)
Gender:	Male	561	(84.9)
	Female	100	(15.1)
Age:	Range		22 – 87
	Mean		46.2
	< 30	103	(15.6)
	30 – 40	156	(23.6)
	41 – 50	152	(23.0)
	51 – 60	250	(20.9)
	61 +	112	(16.9)
Marital Status:			
	Married	565	(85.5)
	Widowed	83	(12.6)
	Divorced/Separated	7	(1.1)
	Single	6	(0.9)
Literacy:			
	Read/write	538	(81.4)
	Cannot read/write	123	(18.6)
Family size:	Range		1 – 10
	Mean		4.9
Education Level:	Range		0 -12
	Mean		4.9
Occupation:			
	Farming	615	(93.0)
	Other	43	(6.5)
Monthly household income (riel): (4,000 riel = US$1)			
	Range	0 –	840,000
	Mean		106,844

Economic Status:

Occupation

Of the 661 heads of household interviewed, 658 reported their occupation. In addition to farming (most of which was rice cultivation), other sources of income were

working as drivers, teachers, builders, and salespersons. In rural Cambodia, both men and women work in agriculture. Among the 98 female household heads, almost all were working, most (87%) as farmers. The rest were employed as school teachers or engaged in petty trading, selling products in front of their houses or by bicycle. They were generally selling fruits, vegetables, and some butchered meat.

No one reported the occupation as fisherman, although many people in the village fish and some sell what they catch.

Monthly Household Income

Monthly household incomes in Lvea Em ranged from 0 to 840,000 riel with a mean income of 106,844 riel ($26 USD). More than 76% of the households earned less than 120,000 riel which is equivalent to $30 USD. These households are living on less than $1 per day. Approximately 5% of the households reported no income.

Table 2.2: Household Monthly income (4,000 riel = $1 USD)

Monthly Income	N	(%)
No income	36	(5.5)
1,000 – 99,999	373	(56.4)
100,000 – 199,999	141	(21.3)
200,000 – 299,999	61	(9.2)
300,000 – 399,999	26	(3.9)
400,000 +	24	(3.7)
Total	**661**	

Education and Literacy:

Education

Educational levels were determined for those who were over 15 years of age. There were 2,371 people over age 15, including 1,225 (51.7%) women and 1,146 (48.3%) men. The educational levels for women and men are presented in Table 2.3.

As Table 2.3 shows, 40.2% of the men had completed secondary school, compared to only 27.5% of the women. Women were more likely than men to report they had no education (29.4% and 13.4% respectively). Women were also less likely to complete primary education.

Table 2.3: Educational Attainment of the Household Members Age 15+

Level of Schooling	Women		Men		Grand Total	
	N	(%)	n	(%)	n	(%)
No Education	360	(29.4)	154	(13.4)	514	(21.7)
Some Primary	386	(31.5)	300	(26.2)	686	(28.9)
Completed Primary [a]	120	(9.8)	163	(14.2)	283	(11.9)
Some Secondary	337	(27.5)	461	(40.2)	798	(33.7)
Completed Secondary [b]	22	(1.8)	68	(6.0)	90	(3.8)
Total	**1,225**		**1,146**		**2,371**	

[a] Completed grade 6 at the primary level
[b] Completed grade 12 at the secondary level

Most heads of household (81.4%) were able to read and write. Of this literate group, 84.9% were men with a mean of 4.9 years of formal education. By contrast, only 69.3% of the second person in the household (90.5% women) were able to read and write.

Household Possessions:

Information on ownership of durable goods and other possessions is presented in Table 2.4. The availability of durable goods is an indicator of household socioeconomic level and may have health effects in terms of general health status and access to the health care.

Asset Ownership/Livestock

One measure of wealth is household possessions. These included: television set (37.5%); electric generator (16.8%); radio (3%); batteries (3.3%); and of a water pump (16.2%).

Another measure of wealth is possession of livestock, particularly cows, as they are significant cash producers as a source of labor in the fields. The cow was the most common animal owned, 38.3% had at least one cow; 14% owned at least one pig and 23.3% owned one or more chickens.

Means of Transportation

The major form of transportation reported by households was the bicycle (64.3%). This was followed by motor-bike (41.1%) and boat (24.7%). Only 1.5% owned animal carts and there was only one car and one tractor in these villages.

Table 2.4: Household possessions

Household items:	n	%
TV	248	(37.5)
Water Pump	107	(16.2)
Battery	22	(3.3)
Radio	20	(3.0)
Generator	11	(16.8)
Clothes Cabinet	11	(1.7)
Dining Table	7	(1.1)
Bed	1	(0.2)
Ownership of animals:	**n**	**%**
Cow	253	(38.3)
Chicken	154	(23.3)
Pig	27	(3.2)
Duck	8	(1.2)
Horse	7	(1.1)
Water buffalo	5	(0.8)
Means of Transportation:	**n**	**%**
Bicycle	425	(64.3)
Motor-bike/scooter	272	(41.1)
Boat	163	(24.7)
Animal cart	10	(1.5)
Car	1	(0.2)
Tractor cart	1	(0.2)

General Health Status:

Participants were asked to identify or describe the symptoms of illness within the household during the previous three months. In addition, they were asked to provide a self assessment of the general health of their household, only 36 (5.45%) households identified themselves as fairly healthy, with little illness. Overall, a total of 2,198 symptoms were reported; only 17 households reported no symptoms of ill health. There average number of symptoms per household was 3.3; 36% of the households reported

fewer than three illnesses, and 2.6% reported no illness. However, 44.6% reported at least four or more illnesses in the household. More than 50% of the village households reported that someone had fever, headache, and cough, which were the most common symptoms.

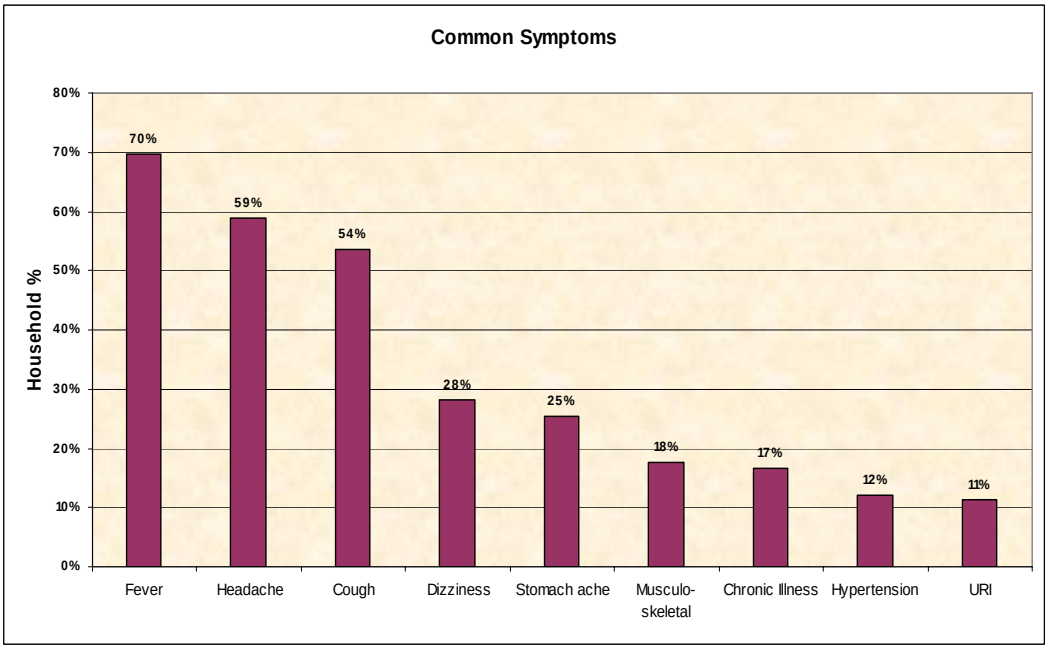
Table 2.5: Common health symptoms reported by household (hh)

Health Symptoms	N	% hh
1. Fever	461	(69.7)
2. Headache	389	(58.9)
3. Cough	354	(53.6)
4. Dizziness, lightheaded	187	(28.3)
5. Stomach ache	168	(25.4)
6. Chronic Illness	132	(20.0)
7. Musculo-skeletal	117	(17.7)
8. Hypertension	79	(12.0)
9. Upper Respiratory Infection	74	(11.2)
10. Heart Problems	63	(9.5)
11. Stomach-Intestinal	56	(8.5)
12. Weakness/Hungry	50	(7.6)
14. Sensory	21	(3.2)
15. Reproductive Health	17	(2.6)
16. Diarrhea	9	(1.4)
17. Infectious Disease	8	(1.2)
18. Rashes	6	(0.9)
Total	**2,191**	

The major causes of morbidity in Lvea Em reported in the assessment are listed in Table 2.5. A large percentage of household respondents (69.7%) reported that a member of the household had fever in the last three months. Other most common symptoms

Headache (58.9%) and cough (53.6%). Dizziness and stomach ache were also among the more common complaints. Chronic illness, weakness, and sensory loss were frequently mentioned. Reports of diarrhea and malaria were low. Musculo-skeletal complaints were reported at 17.7%.

Figure 5: Most Common Health Symptoms



Utilization of Health Care Facilities:

Information on sources and location of health care providers was collected to determine where families sought treatment. The health care sources were distinguished by public sector, the Soksabay Clinic, private clinics and care at home by family members. Table 2.6 presents the utilization of health services. Within the mix of both public and non-government organization (NGO), the Soksabay Clinic was used by 76.2% of households. The next most common treatment source was the home (13.6%).

Respondents were asked where they would seek emergency medical care and how long it would take to travel there. A majority (68.5%) of respondents reported that they would have to go to Phnom Penh to seek emergency care. The other 154 (23.4%) households reported they would go to the Soksabay Clinic for a medical emergency. A few households (5.1%) stated that they would not seek care for a medical emergency.

The time it would take to travel for care in a medical emergency ranged from 20 minutes to 4 hours (mean 3 hours and 17 minutes). Those who reported 20 minutes were usually going to the Soksabay Clinic. Most hospital services are found in Phnom Penh, approximately a four hour trip, depending on the transportation and weather.

Table 2.6: Household Utilization of Health Care Facilities (n = 661)

Health Care Source	N	%
Soksabay Clinic	504	(76.2)
Home	90	(13.6)
Private clinic/hospital	59	(8.9)
Other	2	(0.4)
Missing	6	(0.9)

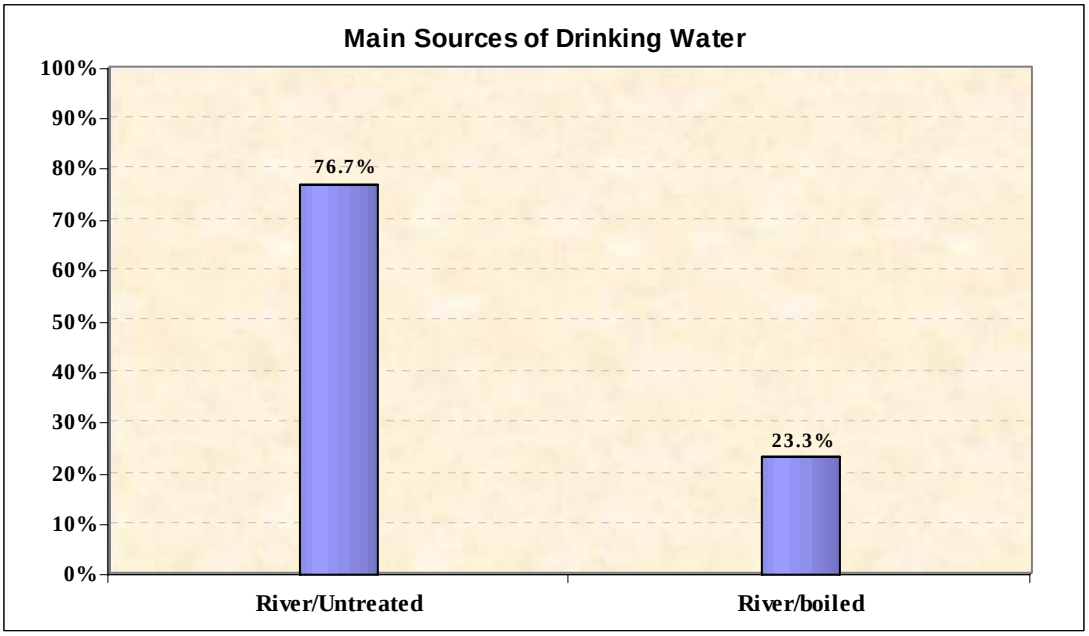
Medical Emergency	N	%
Phnom Penh	453	(68.5)
Soksabay Clinic	154	(23.4)
Home	34	(5.1)
Other	10	(1.5)
Missing	10	(1.5)

Time Travel to Medical Emergency	
Range	20 minutes to 4 hours
Mean	3 hours, 17 minutes

Main sources of Drinking Water:

River water was the predominant source of water for this population. Most (76.6%) households reported using river water as their main source of drinking water (Figure 6). At the same time, the river water also is used for cooking, washing, and bathing. Twenty-three percent (23.3%) reported use of both river and boiled water as their main source of drinking water. No household reported that it used only boiled water for drinking. A few households mentioned using rain water as their main source of drinking water.

Figure 6: Sources of Drinking Water



Ownership of Mosquito Nets

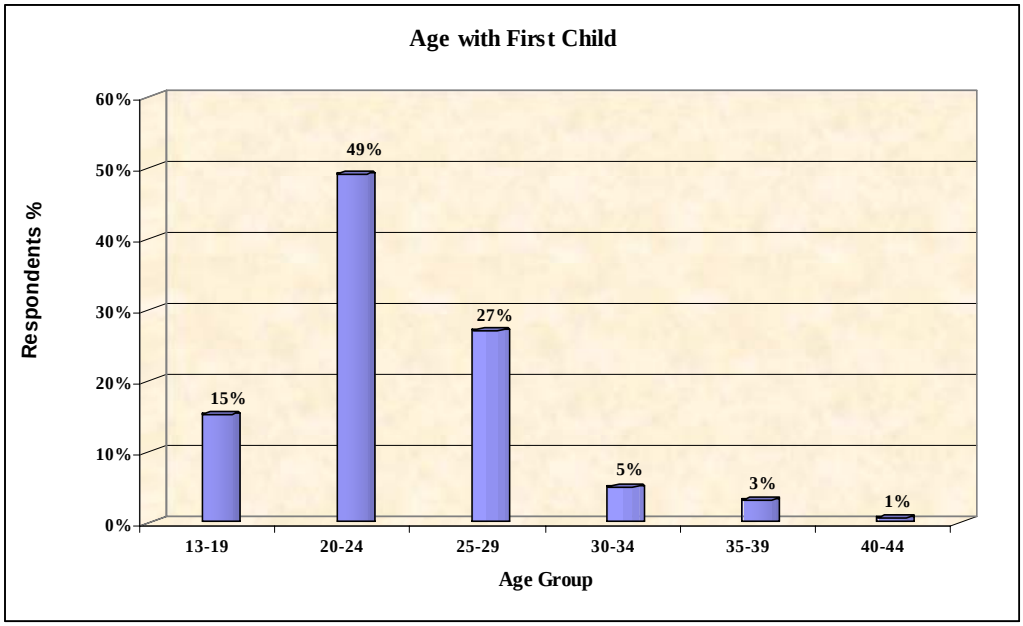
All households reported that they owned and used mosquito nets. The number of mosquito nets and use of insecticide-treated nets was not asked in the survey.

Women's Health Information:

Maternal Age at First Child

Figure 7 presents the ages of women when they had their first child. This information was available from 625 households. The age at first birth ranged from 13 to 44 years with a mean of 23.4 years. Almost half of women had their first child between the ages of 20-24. Fourteen percent of the women were 15-19 years when they delivered their first child. Only 16 women (2.4%) under 18 gave birth.

Figure 7: Women's Age at First Birth



Maternal / Newborn Health

The majority of births (97.3%) were delivered at home; the rest were delivered in a clinic or hospital (Table 2.7).

Table 2.7 below shows the type of assistance during the delivery. Only 1.7% of births were delivered with the assistance of trained health professionals (i.e., a doctor or nurse midwife). The majority (97.6%) of births were delivered with the assistance of a traditional birth attendant (TBA). Births with family member assistance were also reported.

Table 2.7: Location and Assistance with last birth (n = 629)

Location	n	%
Home	612	(97.3)
Clinic	17	(2.7)

Assistance	n	%
Traditional Birth Attendant	614	(97.6)
Doctor	9	(1.4)
Parents	3	(0.5)
Nurse/Mid-wife	2	(0.3)
Neighbor	1	(0.2)

Breastfeeding:

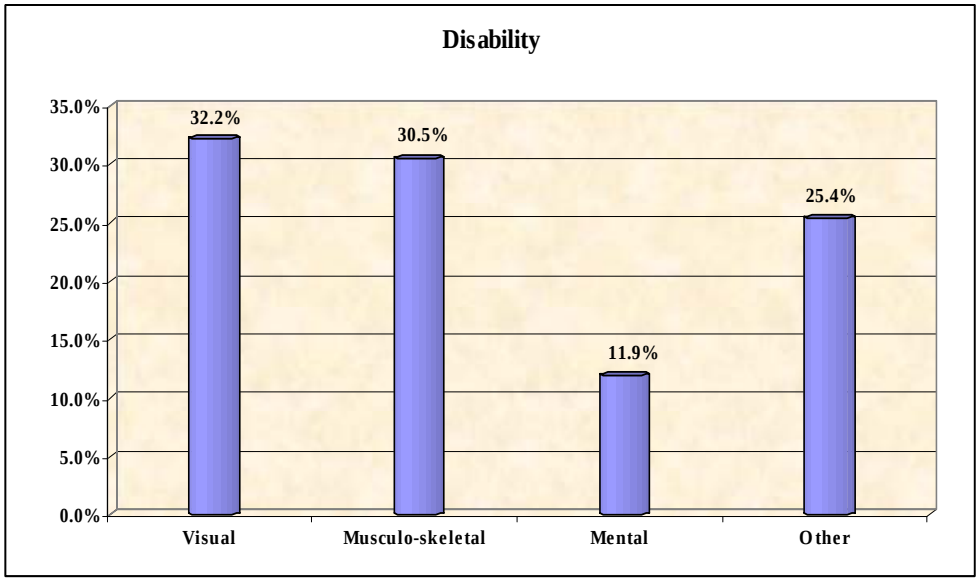
All households were asked if they breast fed their last child and the length of time that the child was fed in this manner. Ninety-eight percent responded yes to breast

feeding. Of the 98%, 94.8% indicated that they breast fed six months or longer; 39.3% continued to breast feed their children between 6 and 17 months; and 54.9% breast fed 18 months or more.

Disability:

A total of 59 households (8.9%) reported ailments that could be considered disabling (Figure 8). Individuals with disabilities ranged in age from 3 to 84 years. Of the 59 cases, four were under the age of 10, and of these, three were born disabled and one acquired a disability due to accident. Figure 6 below shows the types of disability: vision problems, including blindness (32.2%), blurry sight or cataracts; extremity problems (30.5%), including amputation, numbness or pain in extremities or congenital malformations such as one leg thinner than other; and mental health problems of an undisclosed nature (11.9%). Other reported disabilities included unspecified accidents, heart problems, deafness and not specified (25.4%).

Figure 8: Types of Disability

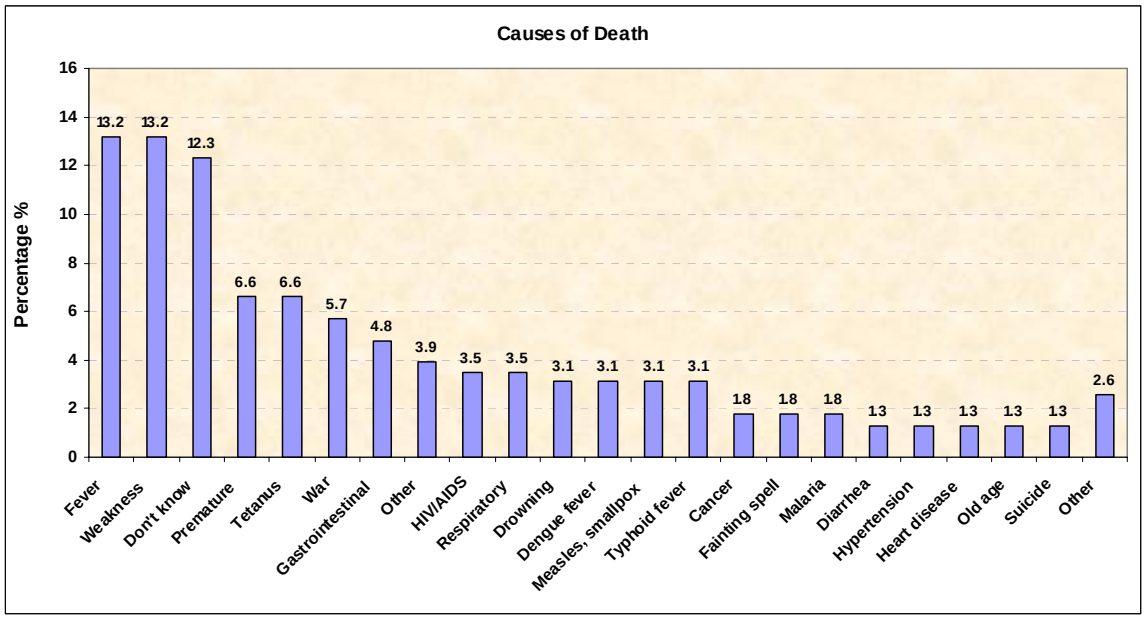


Mortality:

The question about cause of death did not ask whether a diagnosis was made by a health worker so the reasons for deaths may not be medically accurate and may be limited to symptoms. Data collected on reported household deaths included sex, age, relationship, place, date, and cause. Figure 9 below shows the distribution of 228 reported deaths. Causes of death were reported by the heads of household in response to an open-ended question "What was the cause of death?" Exact responses were recorded.

The most commonly reported causes of mortality were: fever (13.2%), weakness (13.2%), tetanus (6.6%), premature birth (6.6%), gastrointestinal symptoms (4.8%), HIV/AIDS (3.5%), and drowning (3.1%). However, for 12.3% of deaths, the cause was unknown. No time frame was given for reporting household deaths and therefore there were reported deaths going back to 1985. Also, in one third of the deaths, the date was not remembered.

Figure 9: Mortality by Cause



Note: 67% of deaths reported occurred between 1985 - 2007; 33% did not have a date.

The highest percentage of deaths by age group was in children under one year of age (29.8%). The most common cause of these deaths was reported as "fever" (22.1%). The next most commonly reported causes were weakness (19.1%), premature birth (16.2%), and tetanus (14.7%). For children between the ages of 1 and 5, the most common cause of mortality was fever (40.5%) followed by weakness (10.8%), measles (8.1%) and drowning (8.1%).

Table 2.8: Causes of Death in Infants and Children

Infant deaths (< 1 year old)			**Child deaths (1 < 5 year)**		
Cause	**N**	**(%)**	**Cause**	**n**	**(%)**
Fever	15	(22.1)	Fever	15	(40.5)
Weakness	13	(19.1)	Weakness	4	(10.8)
Don't Know	12	(17.6)	Don't Know	4	(10.8)
Premature	11	(16.2)	Measles	3	(8.1)
Tetanus	10	(14.7)	Drowning	3	(8.1)
Respiratory	3	(4.4)	Gastrointestinal	2	(5.4)
Diarrhea	2	(2.9)	Tetanus	1	(2.7)
Measles	1	(1.5)	Respiratory	1	(2.7)
Drowning	1	(1.5)	Premature Birth	1	(2.7)
			Heart disease	1	(2.7)
			Diarrhea	1	(2.7)
			Cancer	1	(2.7)
Total	**68**		**Total**	**37**	

In Table 2.9 below, there were 123 deaths reported for those aged 15 years and older. In the age group of 5 – 14 years, fever again was mentioned as the major cause of death (27.3%). Death by unknown causes was the second highest category (21.2%), followed by weakness (12.1%) and tetanus (12.1%). Drowning accounted for two deaths in this age group. In the next age group of 15 to 30 years, the major cause of death was unknown. As indicated in Table 2.9, HIV/AIDS was reported for the first time and accounts for 7.7% of the total deaths. In the age group, 31 to 45 years, HIV/AIDS was noted as the major cause of death (20.0%).

Table 2.9: Causes of Death Ages 5+

Age 5-14	Cause	n	(%)
	Fever	9	27.3%
	Don't know	7	21.2%
	Weak	4	12.1%
	Tetanus	4	12.1%
	Drowning	2	6.1%
	Measles	2	6.1%
	Intestinal	1	3.0%
	Mentally Ill	1	3.0%
	Snake bite	1	3.0%
	War	1	3.0%
	Chicken pox	1	3.0%
Total		**33**	

Age 15-30	Cause	n	(%)
	Don't know	5	19.2%
	War	4	15.4%
	Suicide	2	7.7%
	Malaria	2	7.7%
	HIV/AIDS	2	7.7%
	Weak	1	3.8%
	Swollen neck	1	3.8%
	Lightning	1	3.8%
	Snake bite	1	3.8%
	Poison	1	3.8%
	Paralysis	1	3.8%
	Intestinal	1	3.8%
	Heart disease	1	3.8%
	Headache	1	3.8%
	Fever	1	3.8%
	Childbirth	1	3.8%
Total		**26**	

Age 31-45	Cause	n	(%)
	HIV/AIDS	5	20.0%
	War	4	16.0%
	Weak	4	16.0%
	Don't know	4	16.0%
	Malaria	2	8.0%
	Chronic Illness	1	4.0%
	Blood disease	1	4.0%
	Drowning	1	4.0%
	Hypertension	1	4.0%
	Lung	1	4.0%
	Childbirth	1	4.0%
Total		**25**	

Age 46-55	Cause	n	(%)
	Don't know	5	26.3%
	Intestinal	3	15.8%
	Weak	2	10.5%
	Appendicitis	1	5.3%
	Cancer	1	5.3%
	Heart attack	1	5.3%
	Hypertension	1	5.3%
	Liver cancer	1	5.3%
	Mentally	1	5.3%
	Intestinal	1	5.3%
	HIV/AIDS	1	5.3%
	War	1	5.3%
Total		**19**	

Age 50 +	Cause	n	(%)
	Old age	6	31.6%
	Don't know	5	26.3%
	Weak	3	15.8%
	Fever	1	5.3%
	Hypertension	1	5.3%
	Intestinal	1	5.3%
	Liver cancer	1	5.3%
	Tuberculosis	1	5.3%
	War	1	5.3%
Total		**20**	

Factors Associated with Increased Health Symptoms:

Table 2.10 demonstrates an association between independent variable and health symptoms. Income per capita had a slight association with health symptoms. The results indicated that household with less than 16,000 riel per capita were 1.29 (95% CI: 1.07-2.04) times more likely to report higher symptoms. Of the 660 households that reporting their income, the 38.7% with income greater than 16,000 were 0.68 (95% CI: 0.49-0.94) less likely to report symptoms. Heads of household and 2nd head of household education levels were not associated with symptoms.

No statistically significant association was found between the total number of household possessions and health symptoms. However, statistically significant differences were found between untreated river water and higher health symptoms. The untreated water has the strongest association with increased health symptoms. There were 38.5% of respondents who used untreated river water and these households were 0.52 (95% CI: 0.36, 0.73) more likely to report higher symptoms.

Table 2.10: Association between Independent Variables and Health Symptom(s) Per Capita. (High symptoms defined as one or more symptoms reported per person)

Variables/Characteristics	Total n	Higher Symptoms (%)	Chi-Square X^2	OR (95% CI)	*P* value *
Per Capita Income-Low [a]	660	(30.0)	5.581	1.29 (1.04 - 1.59)	0.018
Per Capita Income –High		(38.7)			
Head HH Edu < 4 years [b]	622	(38.8)	2.074	0.78 (0.55 - 1.10)	ns
Head HH Edu = > 4		(32.9)			
2nd Head HH Edu < 4 years [c]	581	(39.9)	2.278	0.77 (0.55 - 1.08)	ns
2nd Head HH Edu = > 4		(33.8)			
Untreated River Water	661	(38.5)	17.615	0.52 (0.36 - 0.73)	<0.001
Treated (boiled) Water		(20.1)			
Household possession None [d]	658	(33.7)	0.046	1.04 (0.75 - 1.43)	ns
Have Household possessions [e]		(34.5)			

* p Value - significant level < 0.05

a - <16,000 riel (income per capita)

b - HH= household

c - 2nd person to the head of household member

d - Household possession per capita – none

e - Household possession per capita (Total # of the following - household owns motor-bike, bicycle, boat, TV, radio, generator, cow, pig, and chicken tot # of the following)

ns - not statistically significant

DISCUSSION

Introduction:

This project was the initial phase of a community health assessment. The goal was to define and characterize the target community of Lvea Em in terms of health status and socioeconomic factors. Many lessons were learned through the process of developing and implementing this project. A significant result of this initial phase was the establishment of a collaborative relationship between the Soksabay Clinic, the Ministry of Health, and the Lvea Em community.

The data that was collected provides a general description of the current socioeconomic and health conditions in Lvea Em. The data is subjective because the only source of information was self-reporting. The designation of diseases such as dengue fever and malaria may be inaccurate because the clinic does not have the laboratory equipment necessary to test and diagnose conditions. Before developing any major programs, it will be necessary to conduct additional studies focusing on specific health symptoms and relationships with age, income, educational level, housing and water resources. Additionally, it will be necessary to establish a basis for ongoing data collection, program monitoring and evaluation.

The survey tool was used to collect general baseline information about households and individuals in the Lvea Em District. The results will be valuable for future planning in Lvea Em. Overall, most respondents were in the 40–50 years age bracket. The overwhelming majority of respondents, 84.9% were male, and 93% of them were farmers. The results from this study indicate that fever, headache and cough are the

most prevalent complaints. Overall, 461 (70%) of the households had symptoms of fever. However, the study was not designed to collect information on symptoms in individual household members so it was not possible to categorize symptoms, such as fever, by age group or gender. According to the Cambodia Demographic and Health Survey 2005, fever is a primary manifestation of malaria and other acute infections in children. Malaria and fever contribute to high levels of malnutrition and mortality (CDHS, 2005).

Acute Respiratory Infection (ARI) is a leading cause of childhood morbidity and mortality throughout the world (CDHS, 2005). Early diagnosis and treatment with antibiotics can prevent a large proportion of deaths caused by ARI. According to the CDHS 2005, approximately 9% of Cambodian children less than five years of age showed symptoms of ARI. According to the Cambodia Health Information System: Review and Assessment, the main causes of morbidity and mortality are communicable diseases; diarrhea, acute respiratory infections, dengue hemorrhagic fever, malaria, tuberculosis, and malnutrition (DPHI, MoH; 2007). In this community health assessment, headache, cough, fever, dizziness and stomach ache were the main complaints. Although these were not confirmed diagnoses, malaria, ARI and dengue fever are common in Cambodia. The use of mosquito nets was reported by all households but it was not clear if these nets were treated by insecticides. Therefore, it is likely that many of the respondents have these diseases.

Illness burdens families and affects their livelihoods. An ill family member, particularly a sick child, can plunge families living in poverty into an economic crisis. It means someone has to stop working to provide care and perhaps take the child to a health

center or hospital. It means paying the transportation costs to get to the hospital, paying for medicine and care, as well as the loss of income while at hospital. This explains why children are often brought for treatment too late to save them. In rural areas, health problems are worsened by the fact that more than half of the population has limited access to healthcare (CDHS, 2005).

Respondents were asked to report the specific symptoms or illnesses that members of the household had experienced during the three months preceding the survey. Respondents could give more than one answer concerning illness or symptoms. It should be noted that the symptoms collected are subjective. They are based on the head of household's perception of illness with no validation from medical personnel.

The documentation found in the clinic was consistent with the reports produced by the CDHS, 2005. Based upon the monthly activity report of the Soksabay Clinic, ARI was the most common illness in the age group of 0 to 14 years. Diarrhea was noted to be the second most common symptom among the age group of 0 to 4 years. Skin infection was the third most common complaint noted. A recent study highlights the possible connection between health problems and Mekong River water – including skin lesions and itchiness, stomach aches, headaches, and respiratory problems (Kuroiwa, 2007). Lvea Em is located on a tributary of the Mekong River. The population in the study utilized this water for their drinking, and, daily activities such as cooking, bathing, washing clothing and utensils. It is very likely that their health could be directly affected by their water source.

Health Outcomes:

The survey collected information on reported symptoms. These included fever, headache, diarrhea, cough, heart disease, dizziness, stomach problems, musculoskeletal issues, weakness, skin infection, hypertension, and others. The total number of these symptoms averaged by the number of people in the household was calculated and divided into two categories for data analysis: less than one symptom and one or more symptoms reported.

Many studies indicate that there is a strong correlation between education, income and health status (Fournier, 2006). A higher education level usually corresponds with a greater understanding of health issues. Higher education often equates with greater potential for higher income which, in turn, can provide the foundation for better health status and access to health care. It can be assumed that higher education enables greater understanding of how to improve one's standard of living, including preventive practices for better health outcomes. In the context of this study, lower head of household education could suggest that he/she is less likely to be knowledgeable of and less apt to take an active approach to the health of the family. Most household heads were able to read and write. The second household member, usually a female, was often not literate and had fewer than four years of school. In this study, there was no association between the education level of the head of household and health symptoms. Therefore, education was not a factor in this study. This finding was unexpected by the author because according to the CDHS 2005, education level does increase knowledge and understanding of how a disease is spread. The survey indicated that women with no education were less likely to have heard of tuberculosis compared with women with

secondary education, who were aware of the disease, how it spread and that it is a health concern (CDHS, 2005). Another study found that mothers who never attended school and had less than a primary education were unlikely to recognize the important signs and symptoms of acute respiratory infections and were unable to determine when medical treatment was necessary (Saunders, 2005). In Saunders' study, only 22% of women reported that giving their child more liquids was an important action to be taken with the onset of diarrhea (Saunders, 2005). Good health decision-making requires understanding the connection between health and living conditions, such as limiting wet areas around the house, drinking boiled water and knowing dangerous signs related to pregnancy.

Income is another factor that was slightly related to higher health symptoms in the Lvea Em District. This is expected; people with less income have no money to spend on health care and transportation to reach health care facilities, therefore, would report more illness. The degree to which citizens can afford treatment has an impact on one's chances of recovering from a medical condition. Although Lvea Em currently has a free clinic, there still may be costs associated with getting to the clinic as well as taking the time off from work. Of those who participated in this study, 76% of the households reported an income of less than $1 a day. As a result, the clinic visits may not transpire until a medical condition is more severe in nature.

Untreated River Water:

The type of water and sanitation are important determinants of the health status of household members, particularly of children in the villages. Proper hygienic and

sanitation practices can reduce exposure to major childhood diseases. The study indicated that fever and headache may be associated with untreated river water used for drinking and other household activities. There is an important link between water and health, although there is little information available at the community level regarding this issue. This study shows that untreated drinking water was associated with an increased the number of health symptoms. Infectious water-related diseases are still endemic throughout Cambodia and bacterial contamination of drinking water remains one of the most significant public health concerns (Feldman et al., 2007). The study further demonstrates that arsenic in ground water can be toxic even when consumed at low doses over long periods of time, resulting in chronic poisoning. A variety of adverse health outcomes have been attributed to arsenic exposure, including non-cancer effects such as skin disorders, numbness, dizziness, fatigue, and abdominal pain (Feldman et al., 2007). This baseline study confirmed the findings of the Feldman study since many of the health symptoms--reported by the household included the same symptoms; dizziness (28.3%), musculoskeletal weakness/numbness (17.7%), and stomach ache (25.4%).

The Cambodian Inter-Censal Population Survey 2004 (CIPS) concluded that only 33.3% of the rural population of Cambodia has access to safe drinking water (The Atlas of Cambodia, 2006). The main source of drinking water in rural households is unprotected water, primarily river water, reported by approximately 59.7% of the population (The Atlas of Cambodia, 2006). This survey of Lvea Em asked respondents about the source of their drinking water. If households had more than one source of drinking water, respondents were asked to identify each of them. In this study, 100% of the village population reported using river water. A small number indicated some use of

collected rain river water as well. The data point to a general inaccessibility to safe drinking water for the majority of the people in the Lvea Em District. Safe drinking water is a key component to the health of households, particularly for children. Only 23.3% reported boiling the water before drinking it. Proper treatment of water can limit and reduce the seriousness of major childhood diseases such as diarrhea.

According to the Demographic Health Survey 2005, 60% of rural households boil water prior to drinking (CDHS, 2006). This finding is not consistent with the data from the Lvea Em survey, in which only 23% reported that they boil water before drinking and most (77%) did not. The most common response was to do nothing to treat the water prior to drinking. This indicates that education on the importance of boiling water and the adverse health effects of unsafe water is essential. According to World Health Organization, 88% of diarrhoeal disease is attributed to an unsafe water supply (WHO, 2004).

As this author observed while walking around and talking to village residents, the water is allowed to settle prior to drinking it. Well water existed, but was not an option for the population of the Lvea Em District, as they had been informed that their well water contained arsenic and were told not to use it for any purpose. The pumps still in existence are painted red to indicate poison.

Sanitation:

Infectious diseases still kill many people in Cambodia, primarily children, due to poor hygiene and sanitation. As observed by the author, the sanitation situation in Lvea

Em is poor. Cambodia has, in fact, been classified as one of the countries in the world with the lowest sanitation coverage in rural areas (MEDiNEWS, 2007). Households in Lvea Em do not have access to toilets or other hygienic facilities, and awareness of good hygiene practices is limited. As observed, there is no toilet or soap for washing hands at home or in school. Children are more likely than adults to touch unclean surfaces and therefore are particularly vulnerable to unhealthy environments. The households make use of fields and/or bush areas for toileting. Indeed, a lack of sanitation continues to present a major public health menace. According to CDHS 2005, 18% of the reported deaths among infants and children were due to severe diarrhea (CDHS, 2006). Many of these deaths are due to preventable, waterborne diseases or mosquito-carried ailments, enhanced by the nation's lack of sanitation facilities. Lvea Em, has no latrines, waste drainage or sewage systems. It does possess an unsafe water supply and insufficient garbage disposal which contributes to the spread of infectious diseases. As observed, most people do not have shoes. Children bathe and play in the polluted water and near the improperly disposed garbage. The author noticed children played in the dirt, put their fingers in their mouths, went to eat and touched utensils without washing, increasing the risk of infection.

It is estimated by UNICEF that rural sanitation in Cambodia exists for only eight percent of the country, the lowest in the region. In the absence of sanitation facilities, most rural dwellers use rice paddies, banana groves, and other water sources to dispose of their own waste, thus polluting the water on which they depend.

This study did not survey sanitation or hygiene practices. According to a CDHS 2005 survey, 32% of households in urban areas don't have access to sanitation facilities.

Missing hygiene techniques like washing hands, cleaning utensils and proper storing food, lead to increase in risk of infection (CDHS, 2006). A study suggested that sustainable access to improved sanitation facilities is a significant factor in reducing child mortality by up to 55 percent (UNICEF, WHO, 2008). Information regarding sanitation practice in rural Cambodia is limited, especially in Kandal Province, Lvea Em District.

It is likely that the overall environmental conditions of lack of safe water and sanitation places all members of the community at risk. This would account for economic and education resources not having the usual protective effect on household health. When everyone is exposed to environmental pathogens, all will have equal risk of becoming sick. Wealth and education would help in accessing health services but would not prevent disease. This points to the importance of mobilizing the whole community to address water and sanitation conditions.

Soksabay Clinic Activity:

The report from Soksabay Clinic shows that acute respiratory infection (ARI) is the most commonly reported health problem. Overall, approximately 5.4% of children younger than five years had ARIs during the months of April, 2007 through July, 2007. Acute respiratory infection is the leading cause of childhood morbidity and mortality and decreases with the increasing age of the child, according to the Cambodia Demographic Health Survey (CDHS 2005). However, this was not the case based on the Soksabay Clinic reports. Of the children in the 0-4 year age group, 5.4% experienced symptoms of ARI, compared to 6.2% of the children in the 5-14 years age group.

Dysentery and simple diarrhea were the second most common ailment, with most new cases reported in the clinic for the age group of 0 - 4 years (Table 1.1). The average number of new dysentery and diarrhea cases reported per month was 50 and 33, respectively. However, in the needs assessment survey, few households reported symptoms of diarrhea (9). It is possible that there was some misrepresentation; Cambodian people are known to be polite and may not want to mention diarrhea specifically. They may have noted diarrhea as a stomach or intestinal problem instead. It was observed that there are no latrines. The common practice is to seek a secluded area to relieve oneself. Therefore, adults might not even be aware that some of the children had diarrhea. There also may be seasonal variation in diarrheal diseases coinciding with the flooding of the rainy season.

One fifth (20%) of the reported deaths among infants and children were due to severe diarrhea (MEDiCAM, 2007; CDHS, 2006). Dehydration caused by severe diarrhea is a major cause of morbidity and mortality among young children and diarrhea-causing agents are related to contaminated water and practices in food preparation (CDHS, 2005). MEDICAM, a monthly newsletter printed by health organizations in Cambodia, published a report in September about diarrhea caused by bacteria, viruses or parasites present in water. The symptoms often include watery stools which can result in severe dehydration and rapidly lead to death if not treated. Children playing on the ground, touching contaminated water and putting their fingers into their mouths are at high risk for infection.

One of the major causes of death in infants and children in developing countries such as Cambodia is from diarrhea. Since diarrhea is easily treatable, health education

programs should place the management of diarrhea at the top of the priority list. An educational program should be developed that will teach the mothers how to treat diarrhea and to identify the signs that indicate a need for prompt medical treatment.

Women's Reproductive Health

Age of First Birth:

Childbearing at an early age has a detrimental effect on the health of both mother and child. According to CDHS 2005, the median age in Cambodia for women at first birth is 22.5 years. The study found only 2.4% of women had their first birth under the age of 18, therefore early teenage pregnancy is not a significant concern for women in Lvea Em District. The majority of women started their childbearing between the ages of 20 - 24 years (49%).

Birth Attendance:

Limited access to skilled birth attendants has been associated with high maternal mortality rates (CDHS, 2006). Thus, an important component in reducing the health risks of mothers and children is to increase the proportion of babies delivered under the supervision of health professionals. Proper medical attention and hygienic conditions during delivery may reduce the risk of complications and infections that can cause death or serious illness to mother and newborn.

The health assessment documented that 97.6% of the women delivered at home with a Traditional Birth Attendant (TBA) for the delivery. In a conversation with two

birth attendants, they told the author that they were originally forced into providing this service during the Pol Pot regime. They have continued to practice their occupation for 30 years with no formal training or equipment (birth kit). The equipment shown during the conversation consisted of a pair of scissors and a roll of yarn (see Appendix B).

However, with the advent of the Soksabay Clinic, more women are going to the clinic to give birth; approximately 15 to 20 deliveries were noted per month. The advantage of seeking help at the clinic is that there are two beds in the clinic for deliveries and two nurse midwives, who are able to provide medication and support for the mothers and their babies. There is no cost associated with a birth at the clinic. It is assumed that this trend will continue as the inhabitants become more familiar with the clinic and its services.

Adult and Child Mortality:

Children:

There were 228 deaths reported. Of these, 105 deaths were children under the age of 5 years, 56% of them had died at home. The causes of death for infants and children under five were different from those for adults. Almost 40.5% of the deaths in children (1 < 5 years) were from fever, a common symptom of a variety of illnesses. Other causes of death for the children between one and five years of age were weakness (10.8%), measles (8.1%), and drowning (8.1%). In the infants younger than one year, the most commonly reported symptom during the illness that led to death was fever (22.1%), following by weakness (19.1%), which could be a symptom of malnutrition; some other

identified causes included premature birth (16.2%) and tetanus (14.7%). The third major cause of death among this group was "unknown," with 18% of the households reporting that they were unable to identify the cause or did not mention a specific cause. Due to the rivers and flooding around the villages, it is not surprising that drowning was reported as the cause of death for a combined 9.6% of the child deaths.

Children and Adults:

In the age group of 5 – 14 years, fever was again mentioned as the major cause of death (27.3%). Unknown cause was the second highest category (21.2%), followed by weakness (12.1%) and tetanus (12.1%). Drowning accounted for two deaths in this age group. In the next age group of 15 to 30 years, the major cause of death was unknown. It is interesting to note that HIV/AIDS was mentioned in this age group, accounting for 7.7% of the deaths. In the following group, 31 to 45 years, HIV/AIDS was noted as the major cause of death (20.0%). One of the reasons for HIV/AIDS in this age group is migration to the city to work. It has been documented that rural residents possess significantly less knowledge of preventive methods for transmitted disease compared to their urban counterparts. Documentation also indicates that individuals with lower educational levels put people at increased risk of infection due to a lack of knowledge of both disease and methods of prevention (CDHS, 2005).

According to the United Nationals Development Programme, the knowledge of HIV/AIDS and methods of prevention is lower among the poor and women in rural areas (UNDP, 2008). The main route of transmission is between spouses and from mother-to-

child during pregnancy. The country's services remain limited outside of Phnom Penh, and blood safety remains of concern. More research is needed to better understand sexual behavior contributing to HIV/AIDS transmission, especially in rural areas like Lvea Em. Health education at a national level is crucial for reducing HIV transmission.

Lack of specificity in the cause of death is due to the lack of health care facilities and health care providers in the district. Many of the deaths were reported as "don't know" because people died at home and there was no one available to make a determination. This is not uncommon in many developing countries,

Household Composition and Ownership:

According to the CDHS 2005, 77% of the heads of household are male, 23% female. In rural areas, the average household size is 4.9 persons. This statistic is consistent with the Lvea Em assessment, which also found a mean family size of 4.9. The most common family size in the district was either a family of three or a family of six. The nuclear family consisted of a household head, spouse and their unmarried children. A more extended family unit included grandparents, grandchildren, aunts, uncles, nephews, and nieces. In this study, approximately 60 (9%) households had eight to ten family members. Family in Cambodia is considered to be the most important group in society. It is expected that all family members contribute to the upkeep of the unit, either by providing income or agricultural production. Large families support the economy in Lvea Em.

Most rural families in Cambodia rely on subsistence farming as their employment and sustenance. This was also reflected in Lvea Em where 93% of the respondents considered their form of employment to be farming, while the remaining 7% identified their occupation as "other." As this survey was conducted at the height of the rainy season when agricultural productivity is at its peak, it may not reflect seasonal work during other parts of the year.

The information on ownership and household possessions is presented in Table 2.7. The acquisition of household goods can be a good indicator of wealth and general standard of living. For example, having a TV or radio can increase the exposure to health information and innovative ideas; having transportation, such as a motorbike or boat, can provide access to health services and employment.

In these communities, 37.5% of the households owned a television and 3% had a radio. Only 3.3% of households reported batteries, which is the only source of electricity for televisions. That seems to indicate that battery ownership was underreported. It is possible that batteries, unlike television sets, are not considered significant and therefore were not mentioned since they were not specifically asked about. Previous research found that approximately 52% of the rural population owned television sets and 47% owned radios (CDHS 2005). The Lvea Em District numbers were significantly lower. Radios may have been under-reported as they are not considered status items. Households that possess television and radio are more likely to acquire knowledge of health and other issues through public service announcements and advertising. Generally, households in rural Cambodia are much less likely to possess these items. The availability of durable consumer goods is a good indicator of household socio-economic

status. This assessment found no association between ownership of goods and health symptoms. This may indicate that the environment (water and sanitation) is the major factor related to health symptoms and a change in sanitation infrastructure and behavior would have a significant impact on health conditions.

Transportation is extremely difficult due to the poor road conditions, which are virtually impassable during the rainy season. Some of the remote areas can only reach the clinic by boat since Phoum Thom is surrounded by water during the rainy season. This makes access even more difficult. The major modes of transportation in the Lvea Em District are bicycle, motorbike and boat.

The body of literature on general health assessment in rural areas of Cambodia is limited. There is some published literature, but the majority is devoted to specific topics, such as hepatitis, dengue fever, malaria, and HIV/AIDS. Due to the lack of literature, there is little information available for comparison to the results of this study. However, the Cambodia Demographic and Health Survey 2005 report was used as the primary resource to compare results of the Lvea Em assessment.

Study Limitations:

This study had some limitations. The study sampled six out of the nine villages and three communes in the area. Therefore, the data does not represent the whole area. Two of the villages are much closer to the health clinic. The proximity to the clinic did not seem to make a difference in the health symptoms in these villages compared to the four other villages in this study that did not have a clinic. However, this might have been

a factor for more distant villages. The survey could also be subject to reporting bias. The surveys are based on self-reported data, relying on the respondents' memory and willingness to communicate with the interviewers. Respondents may have had better recall of episodes of severe illnesses than mild ones. They also are more likely to report positive attributes (e.g., ability to read and write) and preventive practices, and downplay other aspects (household income or livestock ownership) with the idea of receiving additional income or food assistance. It is also possible that respondents reported owning and using mosquito nets more than actually existed.

Another weakness to the study is possible miscommunication in the translation from English to Khmer, and Khmer to English, while the data were being transcribed and entered. The original survey was written in English and sent to Cambodia to be translated into Khmer. It is possible that the questions were not translated clearly. While the author is able to speak Khmer, she is not able read or write Khmer. Some of the Khmer words and concepts are difficult to translate into English. The twelve village leaders had not previously participated in conducting a survey. They all appeared to be able to read and write, but they were not tested for literacy level. The training was brief due to time constraints and this may have limited their understanding of the process. The roads and transportation to certain areas of villages was challenging, particularly during the rainy season which began during the research period. Further, the month of July is rice planting season and most adults were usually in the rice fields during the day and unavailable. There were several potential sources of error in the data, the translator's interpretation, the interviewer's level of understanding, and the responses by the survey participants. With more training and practice, the effects of these inconsistencies could

have been minimized. For example, the question "How old were you when you had your first child?" was interpreted by at least one of the interviewers as "how old is your first child," an error which was caught and corrected, but there may have been others that were undetected.

When asked about symptoms in the last three months, the respondent provided answers for the total household. There were no further questions asked to specify who in the household or at what age these symptoms occurred. It would have been helpful to link the symptoms to the specific household members. This would have provided more specific information about symptoms by age and gender so that educational programs could be developed for appropriate groups.

Strengths:

One of the strengths of the assessment is that it was the first time that data were collected at the local level in Lvea Em District. The purpose was to provide a baseline for current and future health interventions.

Another positive result from this study is that there was collaboration among the village leaders, the health district and the local health care provider, the Soksabay Clinic. All participants played important roles and learned more about each other in the process.

The implementation of the questionnaire may have resulted in the population thinking more about health issues, which could have a long term benefit. For example, it is likely that the survey questions raised the awareness of the villagers about the connection between behavior and health status. The act of performing the survey may

have increased a local interest in health education. Comments to the author indicated there was receptivity to being taught about hygiene, clinic services, non-traditional health care and other health topics.

CONCLUSION

There is a clear need for more research on a local level. Successful programs cannot be developed without it. Since rural villages vary greatly in terms of specific conditions, it cannot be assumed that a program that works well in one area will automatically work in another. Before programs are created for a particular area, research must be conducted in the district or communes to understand the community composition, characteristics, attitudes and behavior. Planning should consider the variety and range in the patterns of social organization in villages and adapt accordingly. Specialized planning and program design is necessary to reach beyond Phnom Penh to the 85% of Cambodians who live in rural villages.

The results from this assessment will provide meaningful information that can be used by the local health clinic and communities. There is also a need for additional research on specific topics such as maternal and child health, infectious diseases and water and sanitation.

It is the author's hope that the findings of this exploratory research project will provide the framework to initiate a partnership between the University of Connecticut and the Soksabay Clinic and the Ministry of Health of Lvea Em District for collaboration to create and implement programs that would effectively address local health and development.

The long term goal is to implement a comprehensive health program for Cambodians. After the long years of civil war and political turmoil, the current government and existing NGOs have worked to bridge the gap, but much remains to be

accomplished in the Kingdom of Cambodia. Small, but effective interventions will be instrumental to continued health development. Implementing local educational programs and providing training to existing community and clinic health care providers would be a good start.

RECOMMENDATIONS

The following recommendations are based on the results of this assessment and the qualitative observations in the field. The recommendations are separated by specific topics and are intended to focus community health level programs.

Education in terms of hygiene, safe water and sanitation are strongly needed. In order to further plan and develop programs in Lvea Em, it is necessary to understand the inhabitants' level of knowledge regarding these issues. Community programs need to be developed to promote good sanitation habits. Education about issues such as frequent hand washing will inform the community of practices that will help them to reduce the incidence of diarrhea, especially in young children, the most vulnerable. But education alone is not enough, infrastructure development is also needed, especially latrines that will function in this low lying flood plain. Information should be provided to the villagers about when to seek medical attention and tools to overcome barriers that prevent access. This study's goal was to provide descriptive data that could be used in the planning and development of community health services in Lvea Em and similar rural areas.

Certain steps must be taken prior to beginning any new program. These include:

- Collecting background information on the community
- Building a relationship with community leaders and community people to gain their trust
- Collaborating with well-respected community figures and community leader to introduce the project

- Working locally; spending significant time in the area
- Providing extensive training to leaders
- Providing easy to read and friendly materials that contains pictures
- Building partnerships with local authorities and international agencies, NGOs to share lessons learned

Health Education Topics and Interventions

- The importance of clean water, sanitation, and hygiene practices
- Train health staff to provide community education programs
- Hygiene education programs; use role play. puppet shows
- Encourage community action, form focus groups and hold discussions (health clinic, schools, and temples).
- Organize most pressing issues in the villages:
    a) Safe water
    b) Childhood infectious diseases
    c) Causes of infectious diseases
    d) Prevention techniques
    e) Hygiene
    f) Pre- and post-natal care
    g) Nutrition
- Provide materials, posters in the villages, schools, and temples

Basic Home Health Care Education:

- Remedies for fevers in children
- Care for child with diarrhea

- How to recognize dehydration
- General first aid treatment
- When to seek professional medical attention

Malaria Education:

- The importance of using and how to use mosquito nets
- Keep house clean
- Boil and clean water
- Eliminate standing water
- Insecticide treatment of mosquito nets
- How to identify fever and chills as symptoms of malaria and when to seek medical treatment

Transportation program:

It would be beneficial for the villagers to set up a transportation program that assists those unable to reach the health clinic. A community program should be developed that can accommodate the needs of the villages. One possibility might be to establish a health outreach worker who travels to provide care. Another alternative would be to fund the purchase of a boat or motorized vehicle for the clinic to be used to transport villagers who need serious medical help, or to create a community fund for those who can't afford to pay for transportation.

The first step in creating successful integration of education and health care would be to work with the community to identify collective interventions for the purposes of

sharing transportation, child care responsibilities and other health-related activities that would benefit everyone in the community. Providing education as part of the normal social interactions (harvest season celebrations, memorial services, monk services, for example) would make it more familiar. Working with village leaders to identify health leadership could help in planning, determining priorities and disseminating information about new health situations, such as an outbreak of fever. The creation of health committees to coordinate collective activities would work within the existing social structure. Over time, communities might decide to create a system of health volunteers or paid community health workers who would be linked to the clinic. Communication between clinic staff and the village should take place frequently to provide education and feedback.

The purpose of this CHNA was to provide a solid foundation of information for the ongoing health and development of Lvea Em. The author's vision of a healthy population in Lvea Em is one of a thriving health clinic, with committed well trained staff who work with leaders in the community, with traditional birth attendants to improve infant and maternal mortality, and a well developed health community health program supported by the community. It includes a way to monitor and provide feedback to the community to improve quality of life, supported by collaboration with University of Connecticut medical and public health students to conduct further research and program evaluation. The clinic will be a vital part of the community with a presence in all the surrounding villages and it will have the ability to provide medication for the most common conditions. Health education on hygiene issues will provide the stimulus for the community to work together on improving the sanitation and environmental conditions.

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REFERENCES

1. Human Development Index 2007/2008; UNDP, Report. http://hdrstats.undp.org/countries/country_fact_sheets/cty_fs_MDG.html. Accessed April 11, 2008.

2. USAID Cambodia. http://www.usaid.gov/policy/kh.html. Accessed April 3, 2008.

3. WHO. Cambodia. http://www.who.int/countries/khm/en/. Accessed March 1, 2008.

4. WHO. Department of Reproductive Health and Research. Skilled attendant at birth 2006 updates. http://www.who.int/reproductive-health/global_monitoring/skilled_attendant_at_birth2006.pdf. Accessed March 10, 2008.

5. National Institute of Statistics (NIS). The Atlas of Cambodia – National Poverty and Environment Maps. Save Cambodia's Wildlife, Phnom Penh, Cambodia. 2006.

6. National Institute of Statistics (NIS) and ORC Macro. Cambodia Demographic and Health Survey 2005. Phnom Penh: NIS; Calverton, MD: ORC Macro. 2006

7. The Official Summary of The State of the World's Children 2005. http://www.unicef.org/publications/files/EN_Summary.pdf; UNICEF, 2005. Accessed December 6, 2007.

8. Cambodian Communities out of Crisis. http://www.cambcomm.org.uk/ff.html Cambodia: Facts and Figures. Accessed December 6, 2007.

9. Population Reference Bureau (PRB). Cambodia Falls Short of Early childhood Nutrition Goals. http://www.prb.org/Articles/2003/CambodiaFallsShortofEarlyChildhoodNutritionGoals.aspx?p=1. Accessed March 1, 2008.

10. Beaufils L., Population Matters in Cambodia: A Study on Gender, Reproductive Health and Related Population Concerns in Cambodia. Phnom Penh: UNFPA. 2000.

11. Asian Development Bank (ADB). Country Strategy and Program Midterm Review: Cambodia 2005-2009. Cambodia. Manila. August 2007.

12. Than C., Kingdom of Cambodia. Royal Government of Cambodia Ministry of Planning. A Poverty Profile of Cambodia 2004. Ministry of Planning, Phnom Penh, Cambodia. February 2006.

13. Royal Government of Cambodia Council for Social Development. National Poverty Reduction Strategy. 2002 Poverty Reduction Strategic Plan. Royal Government of Cambodia, Phnom Penh.

14. UNFPA, Cambodia At A Glance, 2005: Population, Gender and Reproductive Health. http://cambodia.unfpa.org/. Accessed February 18, 2008.

15. Ministry of Planning National Institute of Statistics, Ministry of Planning; Phnom Penh, Cambodia. Sponsored by: United Nations Population Fund. Cambodia Inter-Censal Population Survey 2004 (CIPS). March 3, 2004.

16. Cambodia US Embassy, Phnom Penh, Cambodia. Improving the Health of Cambodians through Food Fortification. Kempot Province, http://cambodia.usembassy.gov/usaid_nutrient.html. Accessed March 14, 2008.

17. Ministry of Education, Youth, and Sport. 2004. Cambodian National Youth Risk Behaviour Survey, Summary Report. Phnom Penh: MoEYS, UNICEF, UNESCO. http://www.moeys.gov.kh/org.kh. Accessed February 11, 2008.

18. Ministry of Health. 2002. Health Sector Strategic Plan 2003-2007. Volumes I-IV. Phnom Penh: Royal of Government of Cambodia.

19. Panagides D., et al. An Overview of Nutrition Sector Activities in Cambodia. Helen Keller International Cambodia and Asia-Pacific Regional Office. Phnom Penh: Helen Keller Worldwide, 2002.

20. Report on the Assessment of the Functional Literacy Levels of the Adult Population in Cambodia – Phnom Penh, Ministry of Education, Youth and Sport, 2000. . http://www.moeys.gov.kh/org.kh. Accessed February 11, 2008.

21. Statistics and Indicators (2005-2006 school year) – Phnom Penh, Ministry of Education, Youth and Sport, 2006. http://www.moeys.gov.kh/org.kh. Accessed February 11, 2008.

22. Conway T. Halving Poverty by 2015? Poverty Assessment 2006. World Bank Cambodia Country Office. February 7, 2006.

23. Survey by the Urban Poor Development Fund and the Solidarity and Urban Poor Federation, December 2002.

24. UNICEF. http://www.unicef.org/infobycountry/index.html. Accessed January 10, 2008.

25. National Institute of Statistics (NIS), Directorate General for Health [Cambodia] and ORC Macro, Cambodia Demographic and Health Survey (CDHS) 2000 (Phnom Penh, Cambodia, and Calverton, Maryland: NIS Directorate General for Health and ORC Macro, 2001): 121.

26. World Health Organization. Global tuberculosis control: surveillance, planning, financing. WHO report 2005. Geneva, Switzerland: World Health Organization; 2005.

27. "Cambodia." Landmine Monitor Report 2006. Updated October 16, 2006. http://www.icbl.org/lm/2006/cambodia.html. Accessed December 5, 2007.

28. Iliffe S., Lenihan P., Integrating Primary Care and Public Health: Learning from the Community-Oriented Primary Care. International Journal of Health Services. 2003; 33:85-98.

29. Brown T, Fee E., "Palliatives Will No Longer Do". The Deep Roots and Continuing Dynamic of Community-Oriented Primary Care. Am J. Public Health. 2002; 92:1711-1712.

30. Tollman S., Community-Oriented Primary Care: origins, evolution, applications. Soc Sci Med. 1991; 32:633-642.

31. Nutting P. (ed). Community Oriented Primary Care: From Principle to Practice. Washington DC: US Department of Health and Human Services. HRSA Publication; 1987.

32. Abramson J., Kark S., Community Oriented Primary Care: meaning and scope. In: Community Oriented Primary Care. Connor E. and Mullan F. (ed). Proceedings of a Conference heald under the Auspices of the Institute of Medicine. Washington: National Academy Press; 1982.

33. Mullan F., Focht C et al. Community Oriented Primary Care: An Implementation Guide. Washington DC: George Washington University and Hebrew University of Jersualem; 2002.

34. Whitaker D., Heimann J. et al. Area Handbook for the Khmer Republic (Cambodia). Washington, DC. 1973.

35. World Health Organization (WHO), Maternal Mortality in 1995: Estimates developed by WHO, UNICEF and UNFPA (Geneva: WHO, 2001).

36. National Institute of Statistics (NIS), Directorate General for Health [Cambodia] and ORC Macro, Cambodia Demographic and Health Survey (CDHS) 2000 (Phnom Penh, Cambodia, and Calverton, Maryland: NIS Directorate General for Health and ORC Macro, 2001): 117.

37. www.thelancet.com Vol. 366 July 23, 2005

38. Bowles, S.; Health Seeking behavior and barriers to accessing the public health care system in Krong Kep, Cambodia. Centre for International Health – Faculty of Medicine, University of Toronto. Summer 2005.

39. Feldman, P., Rosenboom, J.. Saray, M., Navuth P., Samnang, C., and Iddings, Steven. Assessment of the chemical quality of drinking water in Cambodia. WHO 2007. Journal of Water and Health. May 1, 2007.

40. Veasnakiry, L., Sovanratnak, S., Cambodia Health Information System: Review and Assessment. Department of Planning and Health Information, Ministry of Health. Health Metrics Network. January 2007.

41. Kuroiwa, C., Dams causing algae-induced ill health and poverty? Stories from the Mekong. Department of Health Policy and Planning, School of International Health, the University of Tokyo, Tokyo, Japan. BioScience Irenas 2007; 1(3): 119-120.

42. Saunders, N. Maternal knowledge, attitudes and practices concerning child health among mothers of children younger than 60 months in Kep District, Kingdom of Cambodia. Centre for International Health. Faculty of Medicine, University of Toronto, Canada. Final Report 2005.

43. Fournier, S., Smith, K., Zakus, D. Malaria-related Knowledge, Attitudes and Practices (KAP) in Rural Cambodia. Department of Public Health Sciences & Centre for International Health. Faculty Medicine, University of Toronto, Canada. April 2006.

44. Jong-wook, L. WHO. World Health Organization. Water, Sanitation and Hygiene Links to Health. FACTS and FIGURES – Updated November 2004. http://www.who.int/water_sanitation_health/publications/facts2004/en/. Accessed April 18, 2008.

45. MEDiNEWS. The Monthly Newsletter for Health Organizations in Cambodia. Poor Hygiene and Sanitation Badly Affect Poor Communities. September 2007 Volume 6. www.medicam-cambodia.org. September 2007. Access March 28, 2008.

អង្កេតតំរូវការសុខភាពសហគមន៍
Community Health Needs Survey

ពត៌មានប្រជាសាស្ត្រ
Demographic Information

ឈ្មោះភូមិ.....

1. Name of village:

ឆ្នាំរស់នៅក្នុងភូមិ.....

Years in village:

មេគ្រួសារ.....

2. Head Of household:

ភេទ.....

Gender:

ចំនួនសមាជិកគ្រួសារ.....

Number of household:

ភេទ Sex	អាយុ Age*	ត្រូវជាអ្វីនឹងមេគ្រួសារ Relationship to head of household	ស្ថានភាពអាពាហ៍ពិពាហ៍ Marital Status	អក្សរសាស្ត្រ Literacy	កំរិតវប្បធម៌ Highest Level of Education	ប្រភេទការងារ Type of Work	ចំណូលប្រចាំខែ Income Amount

កំណត់អាយុ : - សរសេរជាចំនួនថ្ងៃ បើសិនអាយុក្រោមមួយខែ

- សរសេរជាចំនួនខែ បើសិនអាយុក្រោមមួយឆ្នាំ

*Age = in days if under a month: in months if under a year: in years if 1 + years.

តើអ្នកមានញាតិសណ្តានទៅសហរដ្ឋអាមេរិកទេ ?.....

3. Do you have family/relatives in the Under States?

តើផ្ទះប្រភេទអ្វីដែលអ្នករស់នៅសព្វថ្ងៃ?.....

4. What type of house do you live in?

មានសំភារៈសំខាន់ៗអ្វីខ្លះនៅក្នុងផ្ទះ?.....

5. Household items?

តើមានប្រភេទសត្វចិញ្ចឹមដែរឬទេ ?.....

6. Do you own any livestock ?

តើអ្នកតែងមានចងមុងទេ ?.....

7. Does your household have any mosquito nets?

តើអ្នកមានមធ្យោបាយធ្វើដំណើរដោយ ?.....

8. Means of transportation:

តើអ្នកយកទឹកទទួលទានមកពីប្រភពណា?.....

9. What is the main source of drinking water?

ពត៌មានសុខភាព :

Health Information:

ចូរបរិយាយពីសុខភាពរបស់អ្នក.....

10. How would you describe your health?

រោគសញ្ញាសុខភាព.....

11. Current health problems/symptoms:

ការព្យាបាលបច្ចុប្បន្ន.....

12. Current treatment:

រោគសញ្ញាជំងឺការពី ៣ ខែមុន.....

13. Illness/symptoms in last three months:

តើអ្នកទៅព្យាបាលនៅទីណាពេលអ្នកមានជំងឺធ្ងន់?.....

14. Where do you go for medical emergency?

តើត្រូវចំណាយពេលវេលាប៉ុន្មានទៅដល់ទីនោះ?.....

15. How long does it take you to get to the emergency place?

ពត៌មានស្ត្រី

Female Information:

អាយុកូនទី ១.....

16. Age with first child?

ចំនួនមានផ្ទៃពោះ.....

17. Number of pregnancy?

សំរាលកូននៅមានជីវិត.....

18. Live births?

ចំនួនកូនរលូត.....

19. Number of miscarriages?

តើអ្នកសំរាលនៅឯណា?.....

20. Where did you give birth?

តើអ្នកមានទទួលការជួយទេ ក្នុងកំឡុងពេលអ្នកប្រសូត្របុត្រ ?.....

21. Did you have any assistance during childbirth?

តើអ្នកបានបំបៅដោះកូនទេ ?.....

22. Did you or do you breastfeed?

តើអ្នកបំបៅដោះកូនរយៈពេលប៉ុន្មាន?.....

23. How long did you breastfeed?

Disabled persons in the family: ជនពិការក្នុងគ្រួសារ

Sex ភេទ	Age* អាយុ	ត្រូវជាអ្វី Relationship	Type of disability (Mental or Physical) ប្រភេទពិការភាព (អរ:យវ:) វិវិកលចរិត	Cause of disability មូលហេតុនៃពិការភាព

កំណត់អាយុ : - សរសេរជាចំនួនថ្ងៃ បើសិនអាយុក្រោមមួយខែ

- សរសេរជាចំនួនខែ បើសិនអាយុក្រោមមួយឆ្នាំ

*Age = in days if under a month: in months under a year: in years if 1 + years.

Deaths Information:

ពត៌មានការស្លាប់

Sex ភេទ	Age* អាយុ	Relationship ទំនាក់ទំនង	Place of death ទីកន្លែងដែលស្លាប់	Date of death ថ្ងៃដែលស្លាប់	Cause of death មូលហេតុស្លាប់

*Age = in days if under a month: in months if under a year: in yeas if 1 + years.

Comments: យោបល់ _____

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Appendix B

Traditional Birth Attendant (TBA)
with birth kit

Traveling to Lvea Em

Ferry ride crossing the Mekong River to Lvea Em District (Approximately 20 minutes)

Residents on the Mekong River

Motor-bike ride to the study site (Approximately 20 minutes)

Study Site:
Lvea Em District, Phoum Thom Commune

Soksabay Clinic

Typical home in the village

One room 20 x 20 thatch house with tin roof
(housing 1 adult and 4 children)

Road conditions in Lvea Em (after a 10 minute rain fall)

Sun drying food preservation

Village market

Meat market on wheels

River water (tributary from MeKong River)

River water stored in containers for daily use

The children of Phoum Thom

A handicapped 6 year old girl

Appendix C

The Cambodian Killing Fields

On April 17th, 1975, the Khmer Rouge, a Communist organization led by Pol Pot, initiated a military coup in Phnom Penh, the capital of Cambodia. The insurgents forced the city dwellers into the countryside and into labor camps. During this regime, it is estimated that 2.7 to 3 million Cambodians died from starvation, torture or execution. That number is estimated to have been approximately 30% of the Cambodian population.

The Khmer Rouge's intent was to revert Cambodia to "Year Zero." This was the term used to describe the elimination of existing standards, lifestyle and Western influence. Any institution that represented collective or organized behavior was forbidden: schools, hospitals, businesses, religion, including even the family. The entire population was forced to work 12 - 14 hours a day in labor camps, primarily farming. Children were separated from their parents to work in mobile groups or as soldiers. The daily meal consisted of one watery bowl of soup with a few grains of rice. Murder was constantly committed with no regard to age or gender. The Khmer Rouge killed people if they didn't like them; if they perceived them as not working hard enough; if they thought people were educated or saw them wearing glasses (this was determined to be a sign of intelligence) or if they noticed a reaction in people when their family members were taken away, probably to be murdered. In some cases, they killed for no reason at all.

After the Vietnamese invaded and liberated the Cambodian people from the Khmer Rouge in 1979, approximately 600,000 Cambodians fled to Thai border camps. Ten million land mines were left in the ground, one for every person in Cambodia. Many of these land mines are still there, which limits the available land to be utilized.

Cambodia is at an early and precarious stage of development. There is no infrastructure due to the loss of a generation of educated people and the total destruction of the civil society during the Pol Pot era. For all intents and purposes, this country is starting from scratch. Cambodia was completely destroyed during the Khmer Rouge years and the country and its people have the overwhelming task of healing physically, mentally and economically.